IRON & COAL TRADES REVIEW

Vol. 181
No. 4,796

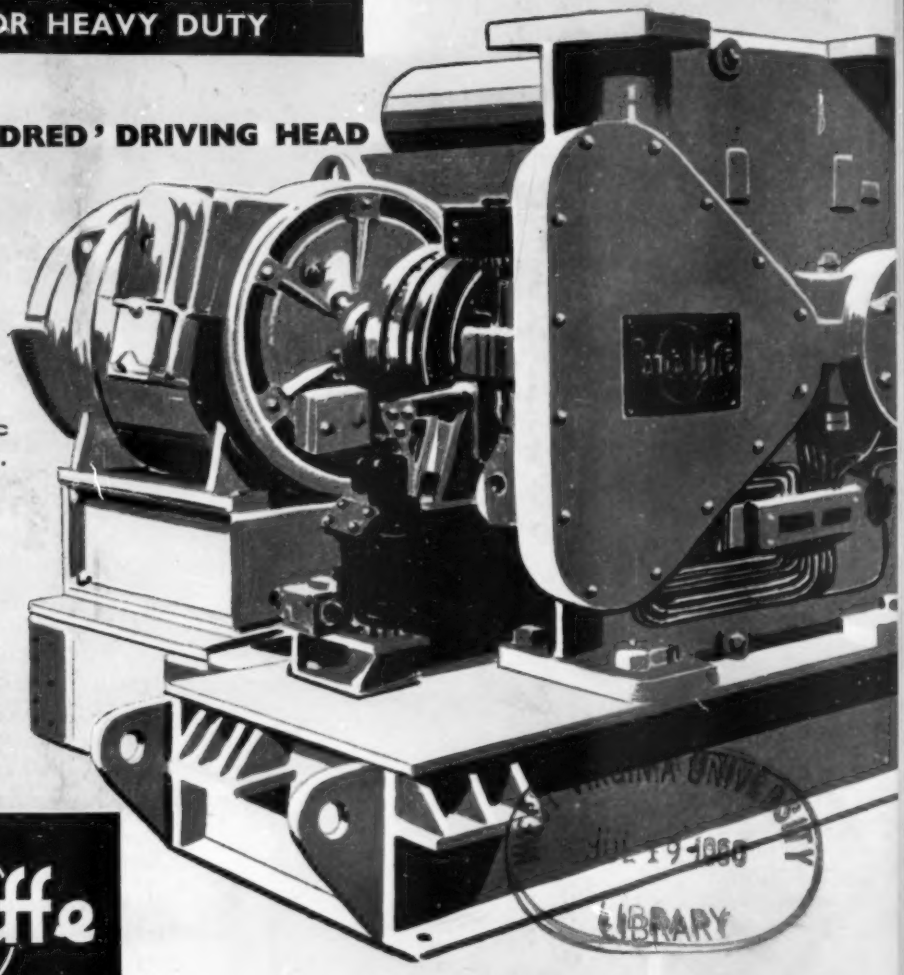
Offices: John Adam House, 17/19, John Adam Street, London, W.C.2
LONDON: FRIDAY, JULY 1, 1960

Registered as a Newspaper.
Single copies 1s. By post 1/4.
Ann. Subn.: 52s. (Abroad 60s.)

DESIGNED FOR HEAVY DUTY

The Sutcliffe
'TWO HUNDRED' DRIVING HEAD

One of the larger two drum driving heads designed to take advantage of heavy duty synthetic fibre conveyor belts. The design incorporates many new features which are explained in our leaflet CG/83. Please send for a copy.



VIRGINIA UNIVERSITY
JUL 19 1960
LIBRARY

Sutcliffe

RICHARD SUTCLIFFE LIMITED
HORBURY
WAKEFIELD

Britain's Best Conveyors

RS93

AG. ENG. LIB
ET1 7 St31
v.181 no.4795-4811 JD-S 1960

Safety with Economy...

Initial cost and maintenance lower than any comparable prop.

Fully approved by National Coal Board Approval No.H.7.

Write for illustrated brochure.

POLAR hydraulic props by B·R·D

B·R·D COMPANY LIMITED
ALDRIDGE STAFFS ENGLAND

A MEMBER OF THE GKN GROUP OF COMPANIES

THE HEAVY ARMOURED STAGE LOADER

The Stage Loader designed to withstand rugged gate end conditions. Using a 14 m.m. alloy round link chain, the ramp portion connects to standard 5 inch Heavy Armoured conveyor sections.
The Power Pack can be either the Meco S.20.R with 22½ H.P. Motor or the Meco S.40.R with 40 H.P. Motor. These power packs are both in common use on Meco Armoured chain conveyors. This Loader is made for 650 m.m. and 500 m.m. chain centres.

Photograph by courtesy of the National Coal Board.

May we send our leaflet to you?

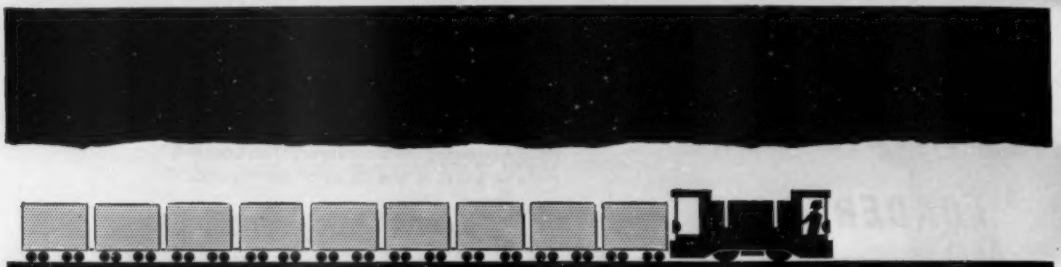
THE MINING ENGINEERING CO. LTD.

MECO WORKS, WORCESTER, ENGLAND

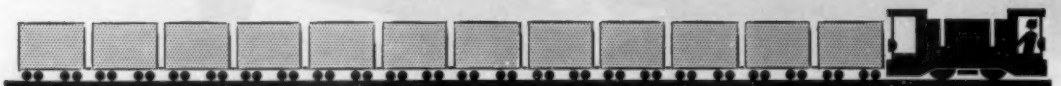
Telephone: Worcester 22291 (7 lines)
Telegrams: Meco, Worcester.

London Office:
50 Pall Mall, London, S.W.1.
Telephone: Trafalgar 4696/7.
Cables: Mecomonde, Piccy. London.

L.P. 208-30



Every battery electric mine loco



can now work longer and harder!

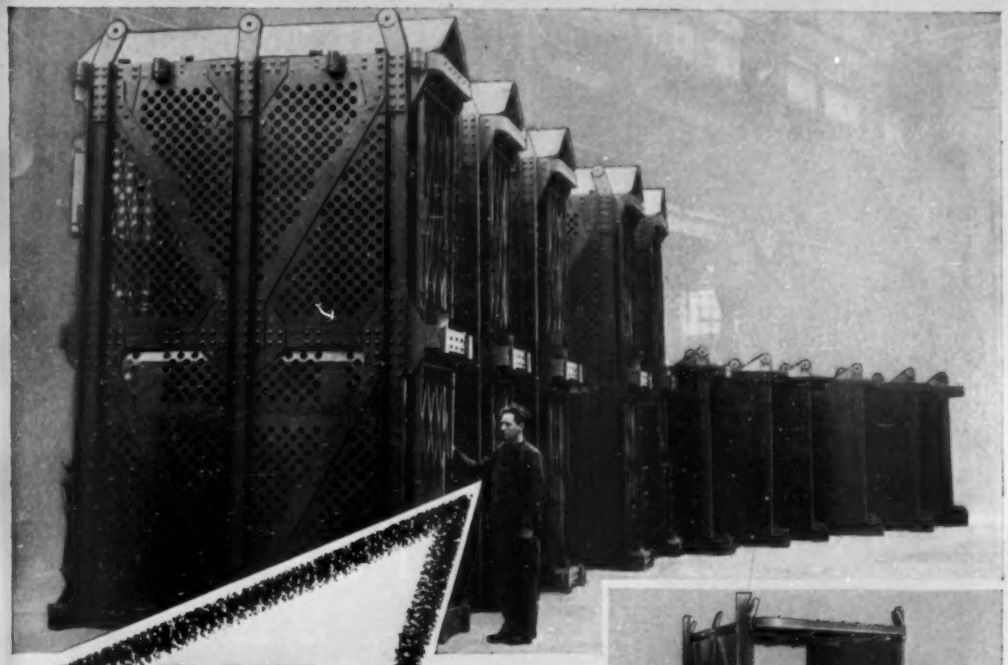
VIII

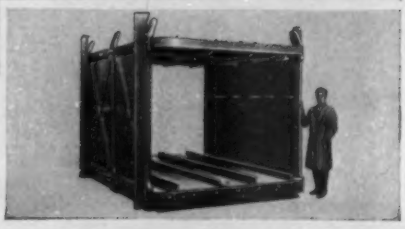
The new Exide-Ironclad, with its patented 'gauntlet' plate, gives up to 35% more power without increase in battery space. Battery-driven mine locomotives can now be equipped to do more work between battery charges. Every battery locomotive designed from now on can be made more compact, or can house batteries of greater capacity. Prolonged service testing has proved that the new Exide-Ironclad not only gives up to 35% more power in the same space, but is also a livelier battery with greater reliability and increased expectation of life.

The new Exide-Ironclad battery with 'gauntlet' plate construction

A PRODUCT OF CHLORIDE BATTERIES LIMITED · BACKED BY WORLD-WIDE SERVICE

Enquiries to: London Elgar 7991; Bristol 64086; West Bromwich 2361; Leeds 20248; Glasgow, Bridgeton 3734; Manchester, Blackfriars 1158; Belfast 27953





PIT CAGES

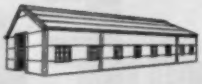
Pit Cages are but one of the many items produced by The Lilleshall Company for the Mining Industry. The Lilleshall Company's Engineering Division undertakes the design, supply and erection of all types of structural and mechanical equipment, including conventional and prefabricated buildings, headgears, conveyors, bunkers, new electric winders, haulages, and winches, also conversions and repairing existing winders. Other Lilleshall activities include glazed sanitary ware, such as wash basins, W.C. pedestals, urinal stalls, glazed bricks and channels, and also concrete and timber products.

LILLESHALL

THE LILLESHALL COMPANY LTD.

ST. GEORGES, OAKENGATES, SHROPSHIRE

TELEPHONE: OAKENGATES 120



Kariscol

Lilleshall "KARISCOL" Prefabricated Buildings are ideal for surface plant, winding sheds, workshops, garages, etc. Patented system, eliminating on-site welding and riveting.

353147

L.G.B

It has been stated that two-fifths of the belting removed from the mines is due to the weft in the fabric not being strong enough for the load, and that *a minimum tear strength of 400 lbs. is needed.*

FOR FACE AND GATE BELTS DIAMOND TYPE BELTING HAS A TEAR STRENGTH OF **500 lbs**

FOR GATE AND TRUNK BELTS HEAVY DIAMOND TYPE BELTING HAS A TEAR STRENGTH OF **750 lbs plus**

J. H. Fenner

J. H. FENNER & COMPANY LIMITED · MARFLEET, HULL

60 699 W.V M 22 1

DATE

AND NOW

WORTHY OF A NAME

(not just a number)

APPROVAL Nº 141 BECOMES THE DIAMOND TYPE RANGE OF

FENAPLAST

COLLIERY CONVEYOR BELTINGS

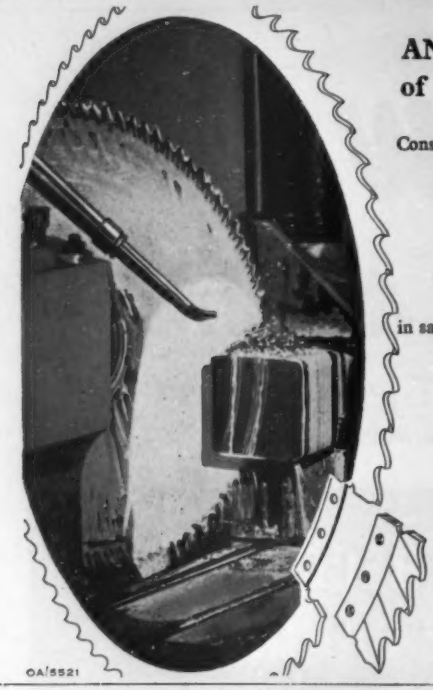
The coal industry is, and will continue to be, a mighty industry. Our faith in it is such that we have developed, and will continue to develop, the FENAPLAST DIAMOND Range of Special Super Quality Conveyor Beltings, TO CARRY MORE COAL—FOR A LONGER TIME—AT LESS COST.

SPECIFY FENAPLAST DIAMOND TYPE BELTINGS

SUPER TOUGH NYLON CARCASS—SOLID WOVEN

& COMPANY LIMITED

J. H. FENNER & COMPANY LIMITED · MARFLEET, HULL



OA/5521

ANDREWS TOLEDO make a clean-cut of cutting problems with SPEARSEG

Consistently to meet the exacting demands of Andrews Toledo Ltd., of Sheffield is a feather in the cap for any supplier. For Spearseg saws have long been extensively used as components in the modern equipment of this important steel group. By long usage, Andrews Toledo recognise the superiority of Spearsegs and the efficient maintenance service that goes with them . . . . the "know-how" of 200 years experience in sawmaking. If you have a cold-cutting problem, get in touch with the Departmental Manager. Phone Sheffield 20202. He's ready to help you with expert advice.

FREE: *A speed calculator for all types of cold-cutting work.*

Spearseg SEGMENTAL SAWS

Made by the world's oldest and most experienced sawmakers.

A **SPEAR & JACKSON** Product

MADE AT AETNA WORKS, SAVILE STREET, SHEFFIELD 4

Reside

36" WIDE CONVEYOR WITH TRAVELLING TRIPPER

MECHANICAL HANDLING EQUIPMENT

JAMES RESIDE LIMITED

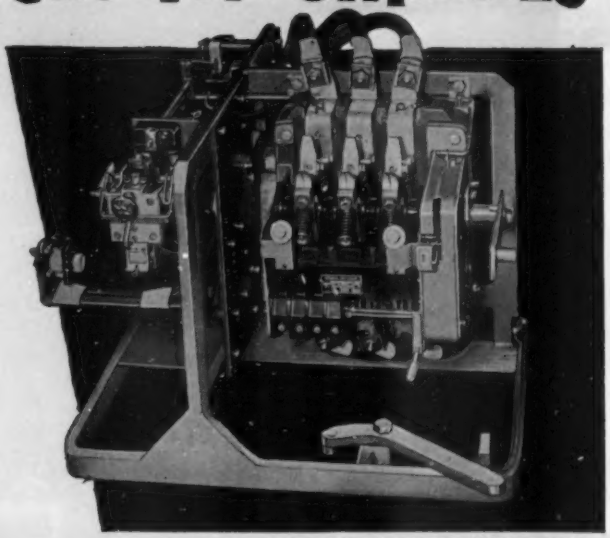
BRIGHOUSE YORKSHIRE

Telephone 1654 (3 lines)

Electrical hazards ELIMINATED with Type BSW-12 FLAMEPROOF SECTION SWITCHES

Robustly built to withstand rough handling well in excess of that encountered in normal mining, our Flameproof Section Switches couple efficient operation with long and trouble-free service. In addition, these switches offer the following important features:

1. **Instantaneous short-circuit protection with latch-out feature.**
2. **Time-lag overload protection.**
3. **Earth leakage protection.**
4. **Earth leakage electrical lockout.**
5. **Spring closing and opening action.**
6. **Isolator interlocked with breaker.**
7. **Removable chassis.**
8. **Motor operated remote control if required.**



Interior with arc shield removed.

Siemens-Schuckert (Great Britain) Ltd

The panel conforms to NCB Spec. P. 7/1950, Flameproof Certificates: FLP.3636 Gp I. and 3637 Gp II. Lock-out Intrinsic Safety Circuit Certificate IS 1016.

FLP

Dept. S94

FARADAY WORKS · GREAT WEST ROAD · BRENTFORD · MIDDX. Tel ISLeworth 2311. 'Grams: Siemensdyn, Brentford, Hounslow. Telex No. 25337

BIRMINGHAM: Tel: MIDLAND 8636. CARDIFF: Tel: CARDIFF 72094 GLASGOW: Tel: ———

MANCHESTER: Tel: ALTRINCHAM 2761/2. NEWCASTLE: Tel: WALLSEND 623461, 624514. SHEFFIELD: Tel: 27218

Smoe's S.9

Hewittic Rectifiers FOR STEELWORKS

The illustration shows two 900 kW Hewittic Rectifiers providing an output of 3600 amps for operating rolling mill auxiliaries in a Scottish steelworks.

There are over 1,500,000 kW of Hewittic Rectifiers in world wide service in capacities up to 30,000 kW.

HACKBRIDGE AND HEWITTIC ELECTRIC COMPANY LTD

HERSHAM • WALTON-ON-THAMES • SURREY

Telephone: Walton-on-Thames 28833 (8 lines) *Telegrams and Cables: "Electric" Walton-on-Thames*

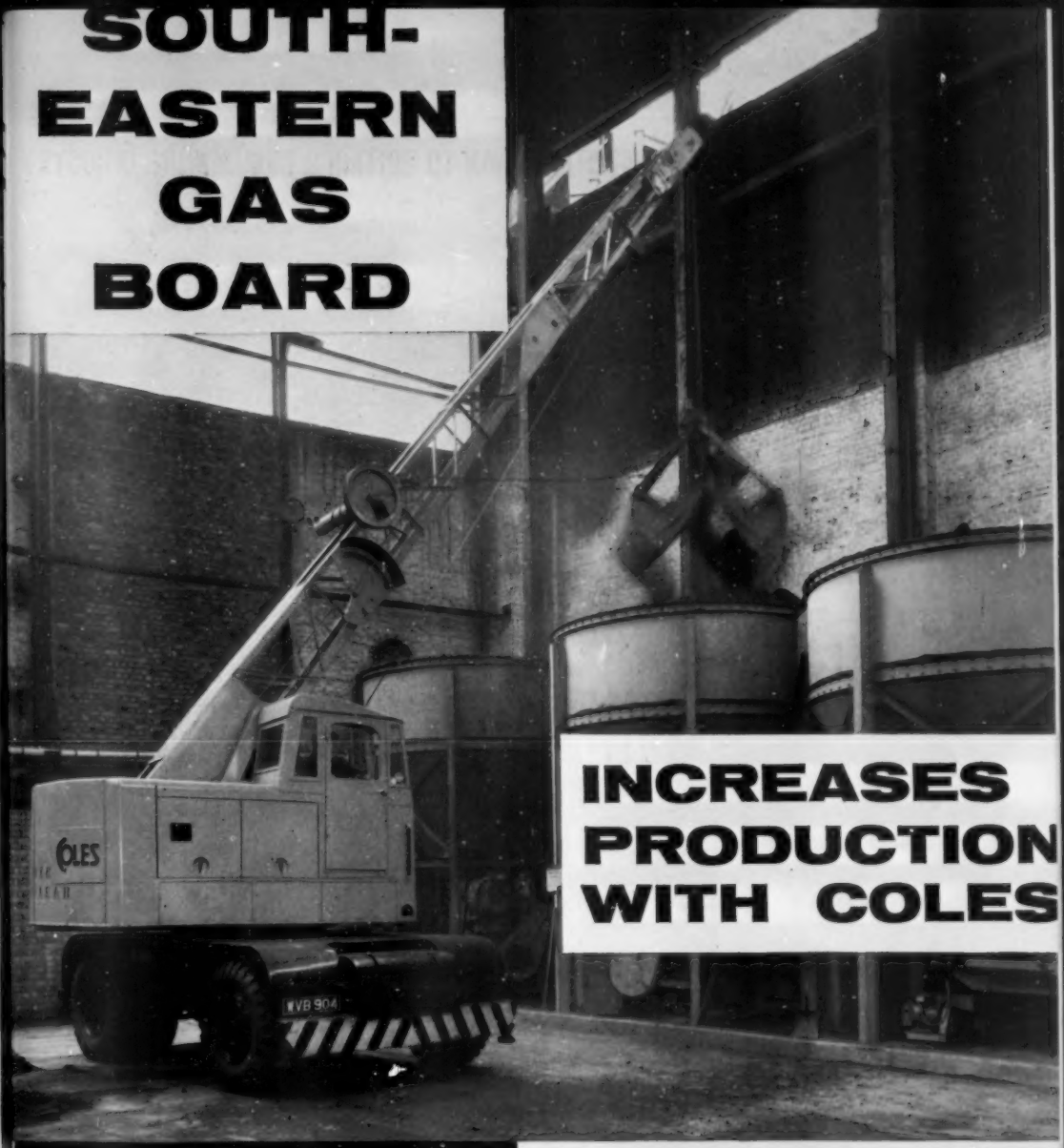
HACKBRIDGE AND HEWITTIC ELECTRIC Co LTD

OVERSEAS REPRESENTATIVES.—ARGENTINA: H. R. Roberts & Cia., S.R.L. Buenos Aires. AUSTRALIA: Hackbridge and Hewittic Electric Co. Ltd., 171, Fitzroy Street, St. Kilda, Victoria, N.S.W.: Queensland: W. Australia: Elder, Smith & Co. Ltd.; South Australia: Parsons & Robertson Ltd.; Tasmania: H. M. Bamford & Sons (Pty.) Ltd., Hobart. BARBADOS and surrounding islands: Electric Sales & Service Ltd., St. Michael. BELGIUM & LUXEMBOURG: Pierre Pollie, Brussels 3. BRAZIL: Oscar G. Mors, Sao Paulo. BRITISH GUIANA: Dandor Commission Agency, Georgetown. BURMA: Neonlite Manufacturing & Trading Co. Ltd., Rangoon. CANADA: Hackbridge and Hewittic Electric Co. of Canada Ltd., Montreal; The Northern Electric Co. Ltd., Montreal, etc. CEYLON: Envee Ess Ltd., Colombo. CHILE: Sociedad Importadora del Pacificio Ltd., Santiago. EAST AFRICA: G. A. Neumann Ltd., Nairobi. EGYPT: Giacomo Cohenca Fils, S.A.E. Cairo. FINLAND: Sahko-ja Koneliike O.Y. Hermes, Helsinki. GHANA, NIGERIA & SIERRA LEONE: Glyndova Ltd. GREECE: Charilaos C. Coroneos, Athens. INDIA: Steam & Mining Equipment (India) Private Ltd., Calcutta, Essun Engineering Co. Ltd., Madras 1. IRAQ: J. P. Bahoshy Bros., Baghdad. MALAYA, SINGAPORE & BORNEO: Harper, Gilfillan & Co. Ltd., Kuala Lumpur. NETHERLANDS: J. Kater, E.O., Ouderkerk a.d. Amstel. NEW ZEALAND: Richardson, McCabe & Co. Ltd., Wellington, etc. PAKISTAN: The Karachi Radio Co., Karachi 3. SOUTH AFRICA: Arthur Trevor Williams (Pty.) Ltd., Johannesburg, etc. CENTRAL AFRICAN FEDERATION: Arthur Trevor Williams (Pty.) Ltd., Salisbury. THAILAND: Vichien Phanich Co. Ltd., Bangkok. TRINIDAD & TOBAGO: Thomas Peake & Co., Port of Spain. TURKEY: Dr. H. Salim Oker, Ankara. URUGUAY: Ciuna Ltda., Montevideo. U.S.A.: Hackbridge and Hewittic Electric Co. Ltd., P.O. Box 234, Pittsburgh 30, Pennsylvania. VENEZUELA: Oficina de Ingenieria Sociedad Anonima, Caracas

Send for Publication R190

R31

SOUTH-EASTERN GAS BOARD



INCREASES PRODUCTION WITH COLES

COLES* CRANES

Having taken the decision to increase production of SEBRITE smokeless fuel at their Wandsworth works, the Board required a crane to assist with the task. It had to be fast-grabbing, highly manoeuvrable, utterly reliable and require minimum maintenance, besides having the built-in quality and ruggedness necessary for continuous, trouble-free service.

The Board chose a COLES . . . the diesel-electric crane with the big reputation for performance!

THE NAME THAT CARRIES WEIGHT

*Registered Trade Mark 616

STEELS ENGINEERING PRODUCTS LIMITED HEAD SALES OFFICE: 143 SLOANE STREET, LONDON, S.W.1.

SALES AND SERVICE: LONDON, BRISTOL, BIRMINGHAM, MANCHESTER, LEEDS, NEWCASTLE, GLASGOW

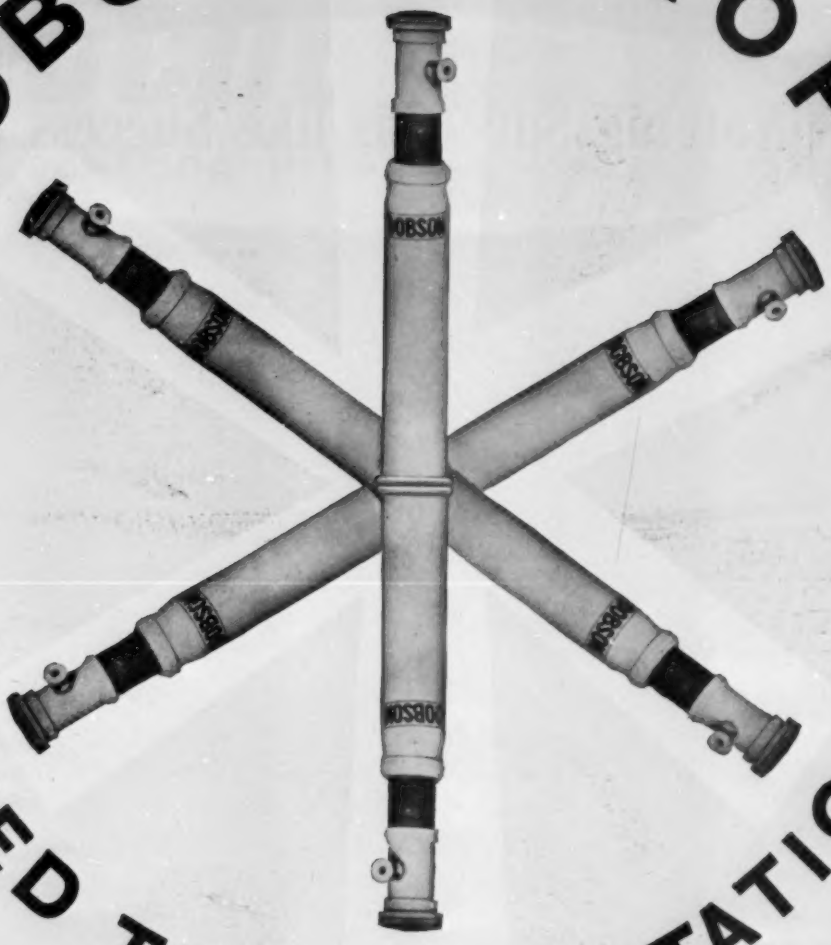
PART OF COLVILLES CONTRIBUTION TO BRITAIN'S COAL MINING INDUSTRY

COLVILLES

FITNESS FOR PURPOSE STEELS

COLVILLES LIMITED 195 West George St., Glasgow C.2.

DOBSON PROPS



DESIGNED TO AVOID STATIC LEAK

Brochure on Dobson Self Advancing Supports available on request.

Dobson Hydraulic Props are designed to avoid static leak. Each prop is long period tested in an inverted position before despatch to customer. Hard Chrome Pressure Cylinders are available at a small extra charge for use in conditions conducive to rusting. Props incorporating this refinement have shown no signs of rusting after a period of two years use in corrosive conditions. Hard Chrome Bores also prolong the life of the Hydraulic Seal.

Dobson Hydraulic Props are available in the following Yield Loads:—
25 Ton, 18 Ton, 10 Ton.
The 10 Ton props are proving ideally suitable as "catch props"

For further information and literature apply to:—

Nothing Succeeds like Success

In the first two years following its introduction, over 60 Washbox Elevator installations were converted to De Brouwer type chain.
Heavy blocks and links of the already well known De Brouwer construction are machined from Mild Steel drop stampings giving great strength and long wearing characteristics. One typical chain continues to give satisfactory service after almost 3 years of heavy duty.

- Maximum Life
- Minimum Maintenance
- Increased Capacity
- Buckets easily changed without disturbing the Elevator Chain
- Existing Elevators readily converted

De Brouwer Chain
for success in
WASHBOX ELEVATORS

by Jenkins RETFORD of course!

W. J. JENKINS & CO. LTD.,
P.O. Box No. 3,
Retford, Notts.
Tel: 2231

London Office,
28 Victoria Street, S.W.1.
Tel: Abbey 1778

Rocol

anti-scuffing products are

BROAD-MINDED

lubricants

A Rocol PRODUCT

Rocol Anti-scuffing Products provide the best means of applying Molybdenum Disulphide—the most advanced lubricant known to engineering science—to all rubbing surfaces.

ANTI-SCUFFING PASTE. In paste form for general purpose use.

ANTI-SCUFFING OIL. For reinforcement of all lubricating oils.

ANTI-SCUFFING SPRAY. In aerosol form—containing bonding resin.

Our Technical Information Service will provide any further information you may require about these and other Rocol Molybdenised Lubricants.

Rocol

MOLYBDENISED LUBRICANTS

ROCOL LIMITED

GENERAL BUILDINGS · ALDWYCH · LONDON, W.C.2. Tel: HOLborn 1985.
ROCOL HOUSE · SWILLINGTON · LEEDS · Tel: Garforth 2261.

1078xb

BLANTYRE
Engineering Coy Ltd

BLANTYRE, Nr. GLASGOW

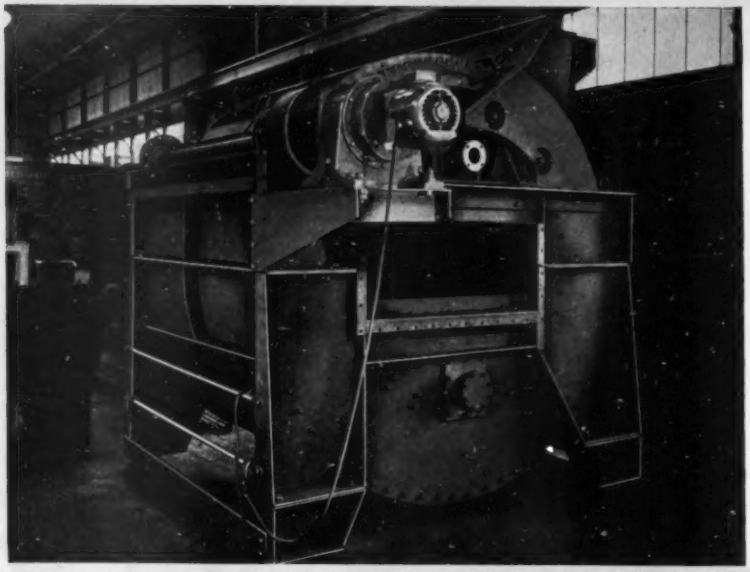
TELEGRAMS—PROGRESS TELEPHONES—BLANTYRE 3582, 3583, 3584

NOW

"BLANTYRE NELSON–DAVIS"

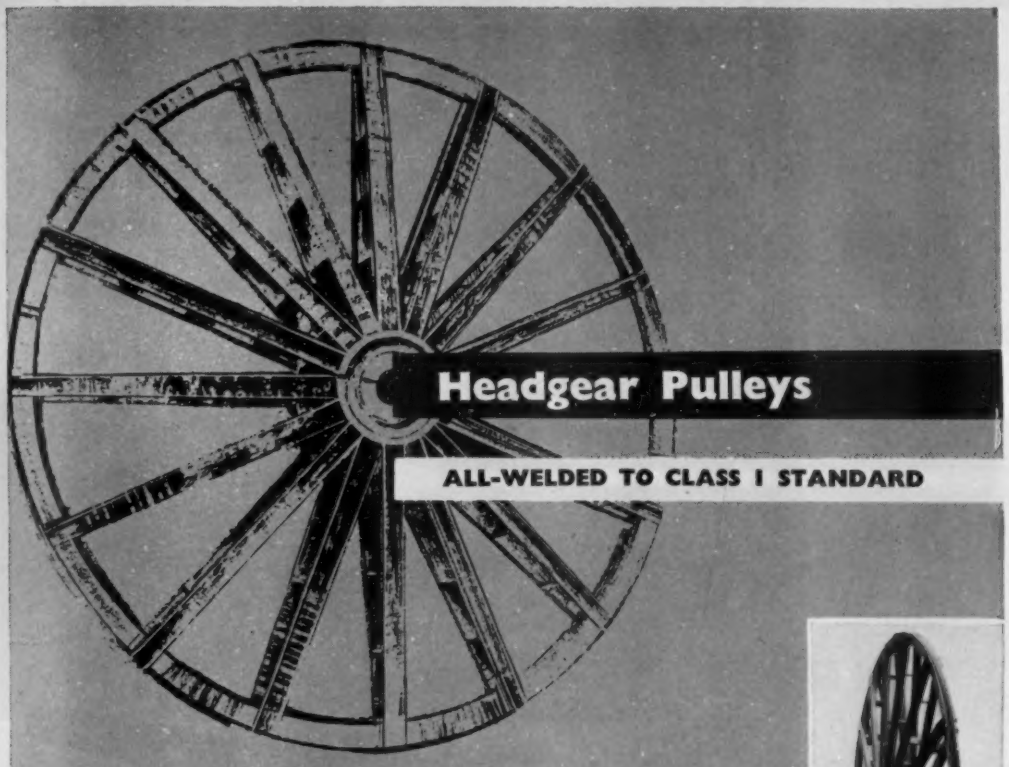
DENSE MEDIA PROCESSOR

WASHING 10" TO ¼" SIZE CAPACITIES 50 TO 500 TONS/HOUR



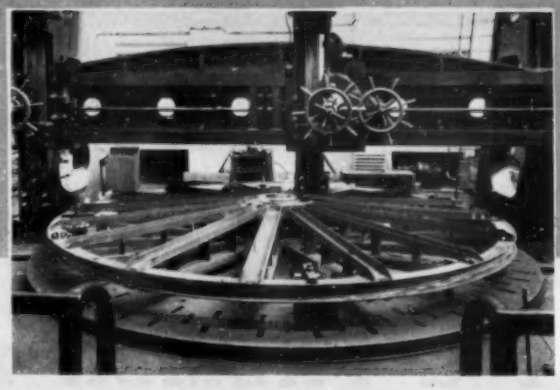
SOLE AGENCY & MANUFACTURING RIGHTS FOR BRITAIN & SOUTH AFRICA BY BLANTYRE ENGINEERING CO. LTD. SEND YOUR ENQUIRIES TO US

AGENTS FOR NORTHUMBERLAND, DURHAM, NORTH YORKSHIRE, CUMBERLAND and WESTMORLAND:
Messrs. WEYMAN & BROWNE, 53 Grey Street, Newcastle-on-Tyne.
Telephone: Newcastle 23725.
AGENTS FOR SOUTH WALES DISTRICT:
C. L. TAYLOR, M.I.Mech.E., "Woodford," 13, The Parade, Whitchurch, Cardiff.
Telephone: Whitchurch 999.
AGENTS FOR MIDLANDS and YORKSHIRE DISTRICT:
Messrs. JAMES C. HUNTER & CO., 47a, Victoria Street, Sheffield 3. Telephone: Sheffield 27041.



Headgear Pulleys

ALL-WELDED TO CLASS I STANDARD



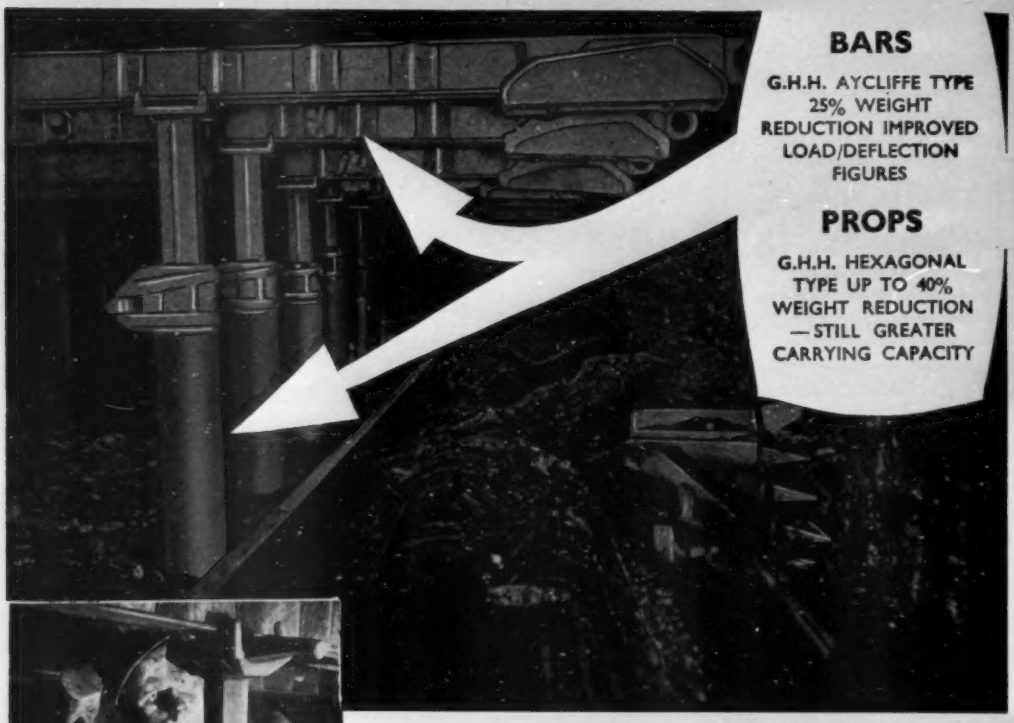
Machining the Rope Groove

ROBEY & CO. LTD. P.O. BOX 23 LINCOLN

TELEPHONE : LINCOLN 21381

LONDON OFFICE :
11, PRINCES STREET, HANOVER SQUARE, W.1
TELEPHONE : REGent 4971/2

ROBEY OF LINCOLN



Props now fitted with
double-wedge lock-box and built-in setting device.

Setting claws not required.

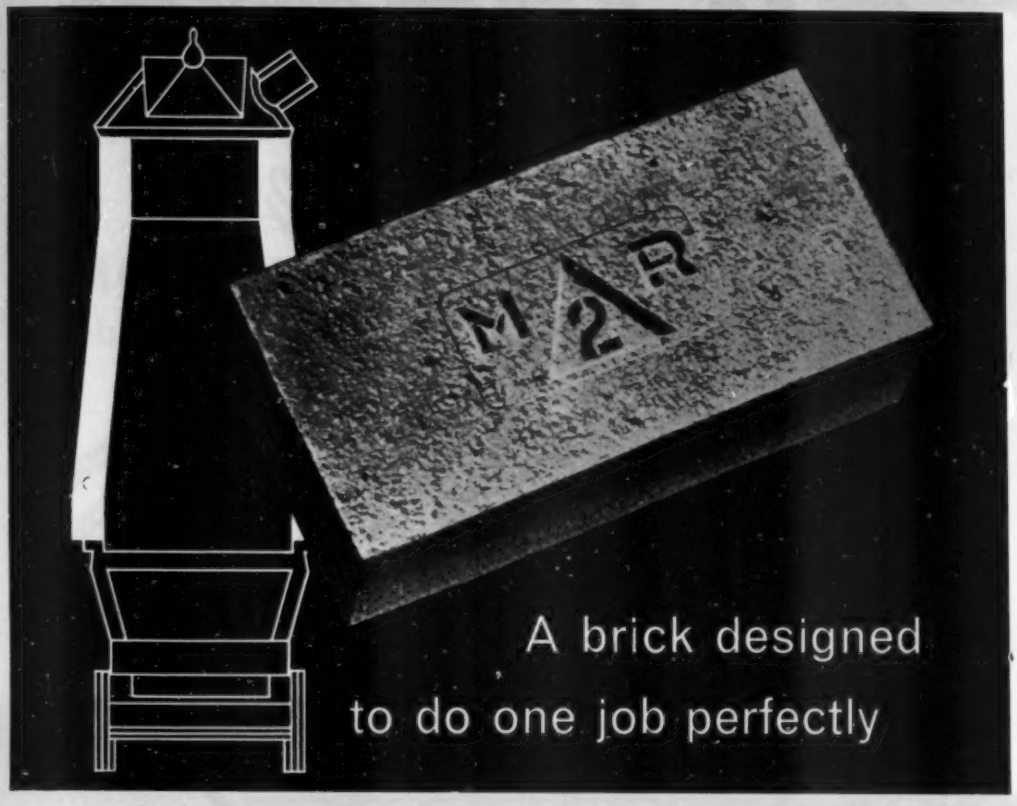
Still higher clamp load.

DOLLERY & PALMER LTD

Specialists in Modern Mining Machinery & Equipment

LONDON OFFICE: 54 VICTORIA ST · LONDON SW1
TELEPHONE: VICTORIA 2494

SHEFFIELD OFFICE: LYDGATE LANE · SHEFFIELD 10
TELEPHONE: SHEFFIELD 64516



This is the M.R.2 Blast Furnace refractory—a very special brick indeed. It was developed for one application—the lining of Blast Furnaces operating on lean ores—with 100% sinter—and driven hard.

M.R.2 is an extremely hard, low porosity refractory to enable it to resist the abrasive effect of the sinter. It is completely unaffected by carbon monoxide and is manufactured from very carefully selected raw materials prepared and moulded under the most stringent control with a final kilning at temperatures of the order of 1600°C to ensure complete volume stability at normal Blast Furnace operating temperatures.

This is a brick with a narrow market, but it is typical of the way the Chemists, Physicists and Engineers at Neston look upon the making of refractories—as a branch of precise chemical engineering. Amongst the other things they make with equal care are M.R.1 and M.R.60 bricks and special shapes; low-heat storage insulating refractories M.I.28, and the whole range of Tri-Mor Mouldables and Castables for Monolithic linings which are having such a profound effect on all classes of furnace design.

MORGAN Refractories Ltd

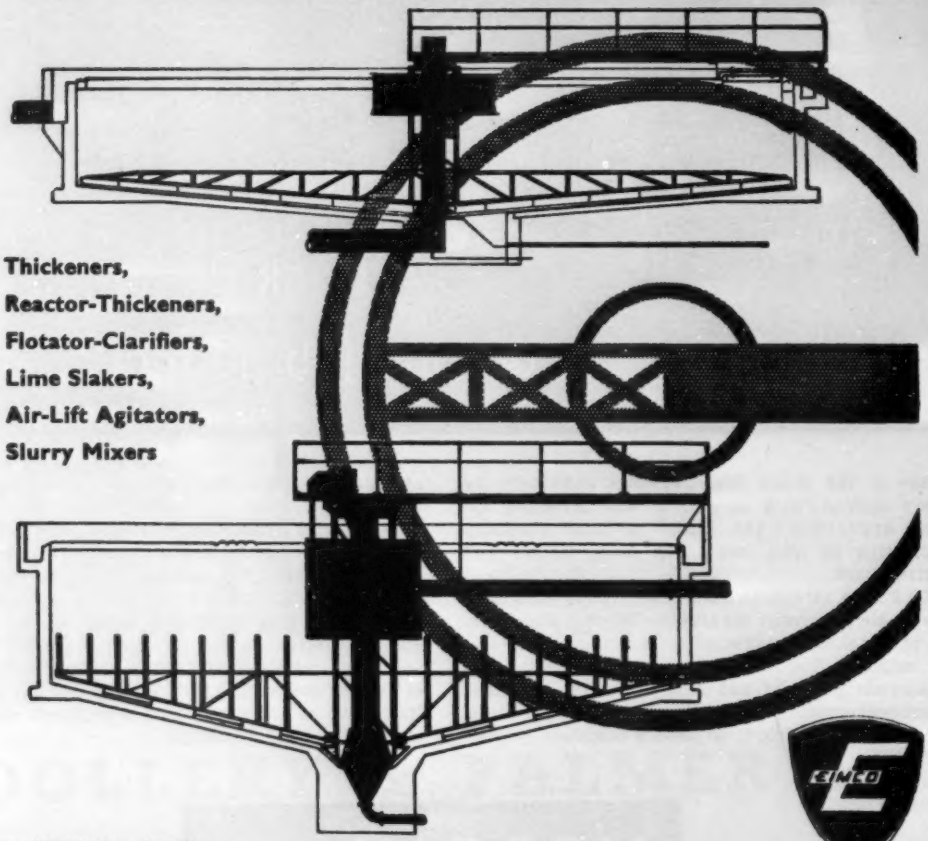
MORGAN REFRACTORIES LTD · NESTON WIRRAL CHESHIRE · TELEPHONE: NESTON 1406

EIMCO PROCESS EQUIPMENT

now available

FROM BRITISH PRODUCTION

For The Chemical, Industrial & Sewage Fields



Thickeners,
Reactor-Thickeners,
Flotator-Clarifiers,
Lime Slakers,
Air-Lift Agitators,
Slurry Mixers

Write NOW for details:—

EIMCO (GREAT BRITAIN) LIMITED

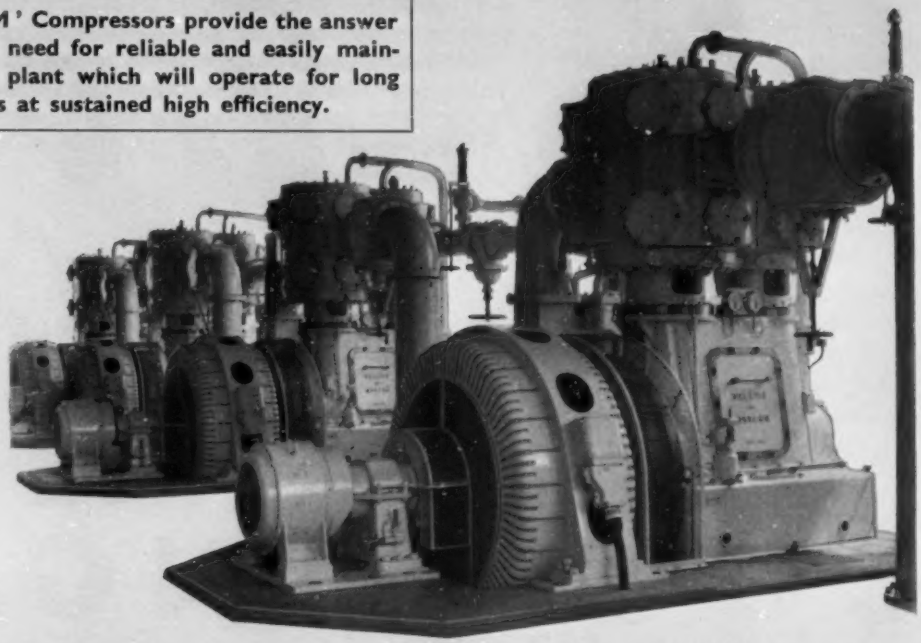
Head Office and Works: TEAM VALLEY, GATESHEAD, 11, CO. DURHAM. LOW FELL 7-7241

London Office: PRINCES HOUSE, [illegible] W1. REG 2184

B & M COMPRESSORS

HIGH and LOW PRESSURE — AIR and GAS— Reciprocating and Rotary types

'B & M' Compressors provide the answer to the need for reliable and easily maintained plant which will operate for long periods at sustained high efficiency.



Reciprocating Compressors
500 to 6,000 c.f.m. to 120 p.s.i.g.

High Pressure Compressors
Up to 50,000 p.s.i.g.

Rotary Compressors
100 to 1,000 c.f.m. to 110 p.s.i.g. These machines are equally suitable as Vacuum Pumps or as Gas Boosters.

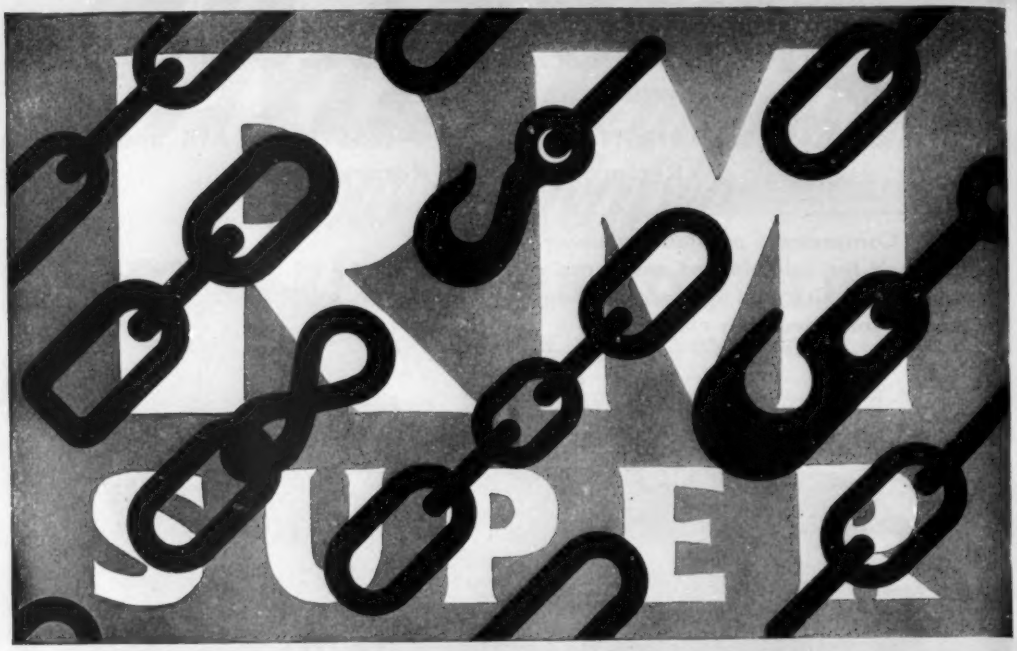
Belliss & Morcom Ltd., makers of the World's best Compressors, are prepared to design and build Compressors and Vacuum Pumps for special purposes, and are always interested in receiving enquiries for the manufacture of machines to *your own designs.*

'HAVE IT BELLISS BUILT'

Belliss & Morcom Ltd
BIRMINGHAM 16 · ENGLAND

London Office: 25 Victoria Street, S.W.1

STEAM TURBINES · COMPRESSORS · VACUUM PUMPS
DIESEL ENGINES · DUAL FUEL ENGINES · STEAM ENGINES
CONDENSING PLANTS · "ARCA" AUTOMATIC REGULATORS



1·5% MANGANESE STEEL

COUPLINGS

1 Almost twice as strong as when made in wrought iron.

2 Freedom from embrittlement after heavy overstrain.

3 Welds made by our special process are extremely sound.

4 No periodic heat treatment required to relieve fatigue in material.

5 Owing to the High Impact Value of the steel they are especially suitable for withstanding severe shocks as encountered in mining.

6 Greater resistance to corrosion than wrought iron or mild steel.

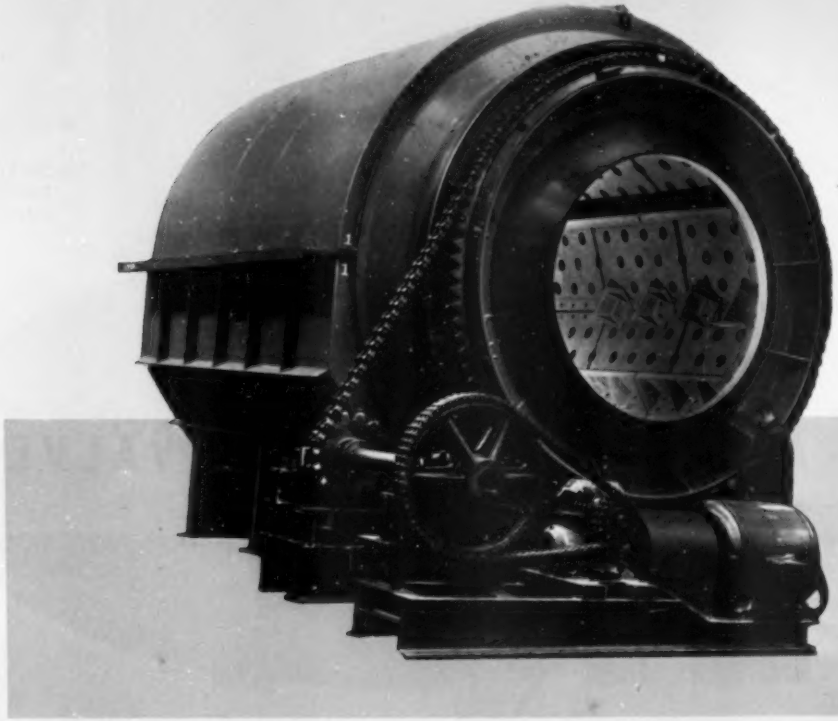
7 Do not develop brittleness at sub-zero temperatures like wrought iron or mild steel and not seriously affected even at temperatures as low as—30 deg. C.

ROBERT MORRIS LTD. · FARNWORTH · BOLTON

TELEPHONE FARNWORTH 750/1

THE McNALLY-NORTON

ROTARY BREAKER



This recent addition to our Range of Coal Breakers is mounted on 4 Heavy Duty, anti friction bearing trunions. The Breaking plates are heavy duty cast manganese steel and the whole is mounted in a dust hood. The above photograph shows a 9′ × 12′ machine erected in our works prior to despatch to site

NORTONS TIVIDALE LIMITED

TIVIDALE · TIPTON · STAFFORDSHIRE

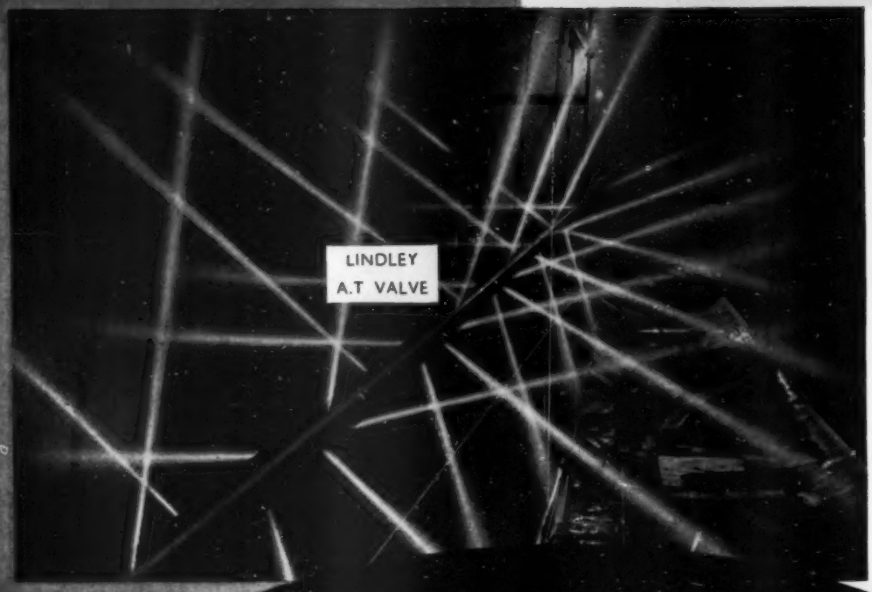
Telephone: TIPton 1201

SCOTLAND
Fraser & Borthwick Ltd.
Delta Electrical Works
59 Pitt Street, Glasgow, C.2
Telephone: CENtral 0171

NORTHUMBERLAND, DURHAM, CUMBERLAND & WESTMORLAND
H. Scott Corder
Lloyds Bank Chambers
Collingwood Street, Newcastle, 1
Telephone: 2-2892

SOUTH WALES
F. N. Dayson Ltd.
Dowlais Chambers
West Bute St., Cardiff
Telephone: Cardiff 24061

YORKSHIRE, DERBYSHIRE, LEICESTERSHIRE, NOTTINGHAMSHIRE, WARWICKSHIRE, WORCESTERSHIRE, STAFFORDSHIRE, SHROPSHIRE, LINCOLNSHIRE, LANCASHIRE, CHESHIRE AND NORTH WALES
Richard Bathgate
219 Corn Exchange Buildings
Fenwick Street, Liverpool, 2
Telephone: ENtral 0852



IN ACTION!

Complete water barrier for fifty yards on 2 in. dia. pipe, with additional leads to the underside of the conveyor belt with 1 in. dia. pipe.

- **CONVEYOR PROTECTION**
- **ESCAPE ROUTES**
- **METHANE DRAINAGE INSTALLATIONS**

LINDLEY

AUTOMATIC THERMAL VALVE

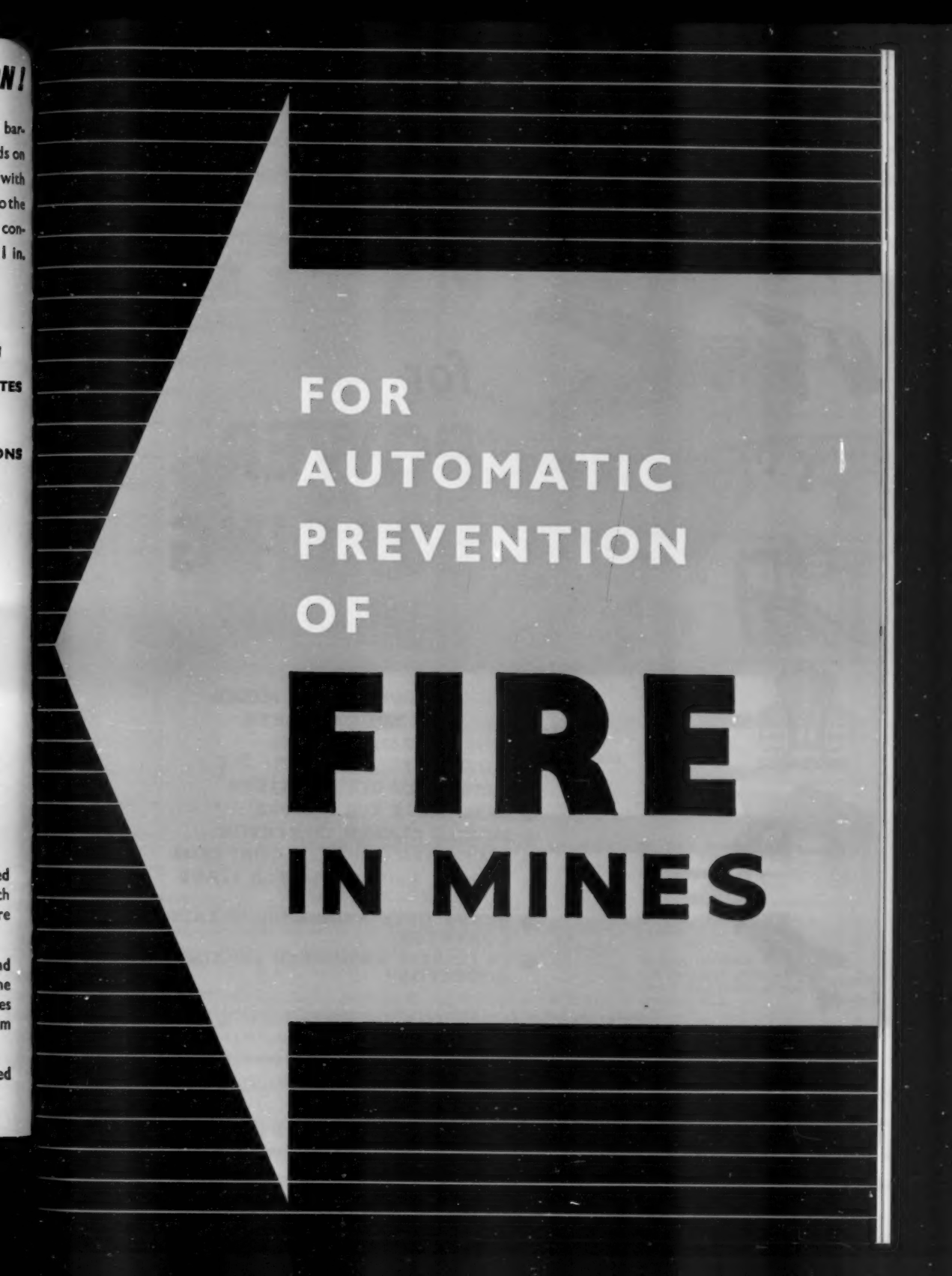
PATENT NOS. 803861 AND 803862

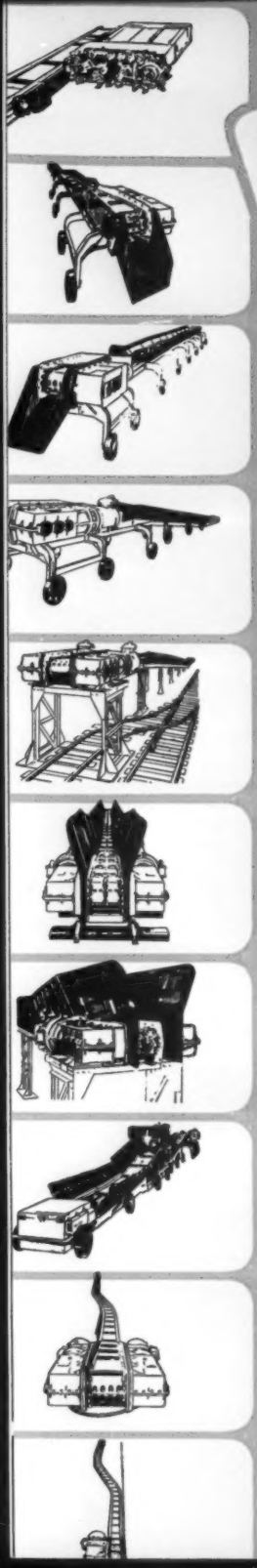
- The automatic operation of the valve is obtained by the collapse of a fusible link or links, which operate at the very low atmospheric temperature of 140 F.
- Simultaneously, with the collapse of a link, and the formation of the above water barrier, the Davis switch key which is fitted to all valves comes into operation, and at once rings an alarm bell, and stops the conveyor.
- Any number of collapsible links can be attached to one valve, in anticipation of possible risks.

H. LINDLEY LIMITED

DEANSTONES WORKS - DEANSTONES LANE

QUEENSBURY - Nr. BRADFORD


FOR
AUTOMATIC
PREVENTION
OF
FIRE
IN MINES



CRAWLEY

for

POWER LOADING

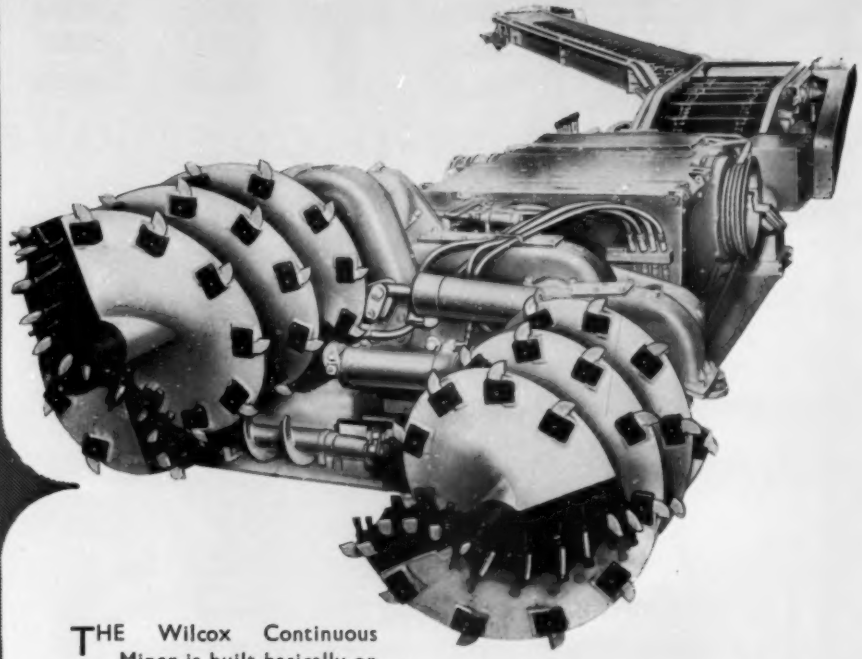
- **WILCOX CONTINUOUS MINER**
- **CRAWLEY MIDGET MINER**
- **MOBILE STAGE LOADER**
- **MOBILE STAGE FEEDER**
- **EXTENSIBLE STAGE LOADER**
- **EXTENSIBLE TUB LOADER**
- **MOBILE BUNKER CONVEYOR**
- **STATIONARY BUNKER CONVEYOR**
- **MOBILE AND EXTENSIBLE STAGE COAL BREAKER UNITS**
- **HEAVY DUTY ARMOURED SNAKING CONVEYOR**
- **C5 LO-HITE ARMOURED SNAKING CONVEYOR**

Crawley products are of high capacity, rugged in design and low in maintenance cost. They have a high degree of standardisation and interchangeability of parts, and offer an efficient and sure solution to the conveying and power loading problems common to the longwall system of mining throughout the world.

CRAWLEY INDUSTRIAL PRODUCTS LTD.
WELLESLEY ROAD, CROYDON, SURREY. Telephones and Telegrams: CROYDON 7177 (4 lines)

A COMPANY OF THE AYLING INDUSTRIES GROUP

CRAWLEY-WILCOX
CONTINUOUS MINER



THE Wilcox Continuous Miner is built basically on a shortwall coal cutting machine chassis with two augers 41in. long and varying in diameter from 22in. upwards according to seam thickness. Each is equipped with carbide cutting picks on both front cutting edges and auger scrolls. The augers are driven through reduction gearing from the motor and rotate in opposite directions. Hydraulic controls are fitted as an integral part to both machine and conveyor.

Coal is discharged from the machine on to a bridging conveyor, which in turn discharges on to a chain conveyor. The bridging conveyor can pivot a full 180 deg. at either end, so giving maximum operational flexibility.

CAPACITY Results achieved to date in a seam of 36in. are as high as 300 tons per shift from an eleven-man team.

- **The lowest Continuous Miner on the market today in height, cost and maintenance.**
- **Cuts seams from 22in. to 46in.**
- **Can produce up to 300 tons per shift with two 3 men crews at the working face.**
- **Currently producing coal under roof conditions where other mechanical equipment has failed.**

MORE TONS PER MAN AT LESS COST PER TON

STEEL
AND YET MORE
STEEL
AND MORE **W-D** COKE OVENS

Ravenscraig
Colvilles Ltd.

Redbourn
Richard Thomas & Baldwins Limited

Lysaght
John Lysaght's Scunthorpe Works Limited

Corby-Deene
Stewarts & Lloyds Limited

Bairds
Bairds & Scottish Steel Limited

Appleby-Frodingham
Appleby-Frodingham Steel Company

Pretoria
South African Iron & Steel
Industrial Corporation Limited

WOODALL (W/D) DUCKHAM

CONSTRUCTION COMPANY LTD

Woodall-Duckham House · 63-77 Brompton Rd., London S.W.3 Tel: Kensington 6355 (14 lines) Grams: Retortical (Southkens) London

A MEMBER OF THE WOODALL-DUCKHAM GROUP OF COMPANIES

SPECIFICATION: Headgear Pulley consisting of Cast Iron Rim and Boss connected with B.B.B. Iron Arms. Machined Joints. Bored a nip fit on the shaft. Bearings either Stauffer lubricated, Ring Oiling or 'Cooper Roller Bearing type.

CENTRAL CHAMBER MACHINED TO RECEIVE LOCATING SWELL ON THE SHAFT. NO KEYWAYS.

RIM JOINTS SECURED WITH FITTED BOLTS. GROOVE MACHINED WHERE ROPE FITS, IF REQUESTED.

HOOP SEATS MACHINED TO RECEIVE SHRUNK ON WELDLESS STEEL HOOPS.

Headgear pulleys in Halves up to 20 feet diameter, to latest N.C.B. specifications

For new installations, and reconstruction of existing installations when shafts are due for replacement

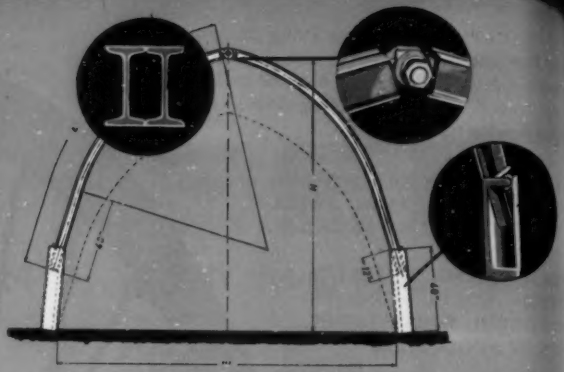
NEEDHAM BROTHERS & BROWN LTD

BARNSLEY, YORKSHIRE

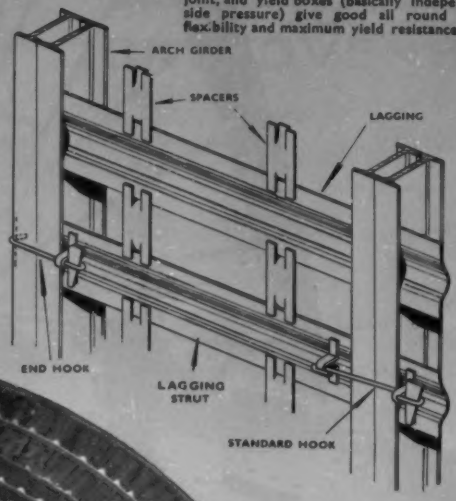
Have specialised in the manufacture of headgear pulleys since 1890

HOLLYBANK ENGINEERING Co. Ltd.

YIELDING ROADWAY SUPPORTS WITH STEEL LAGGING AND STRUTS



Special box section steel beams, central flexible joint, and yield boxes (basically independent of side pressure) give good all round support, flexibility and maximum yield resistance.



THE BRITISH "USSPURWIES" SYSTEM OFFERS YOU

- Bigger, better, and safer roads
- Greatly reduced back rippings
- Reduced transportation and arch costs, as each yielding support can be used again and again.

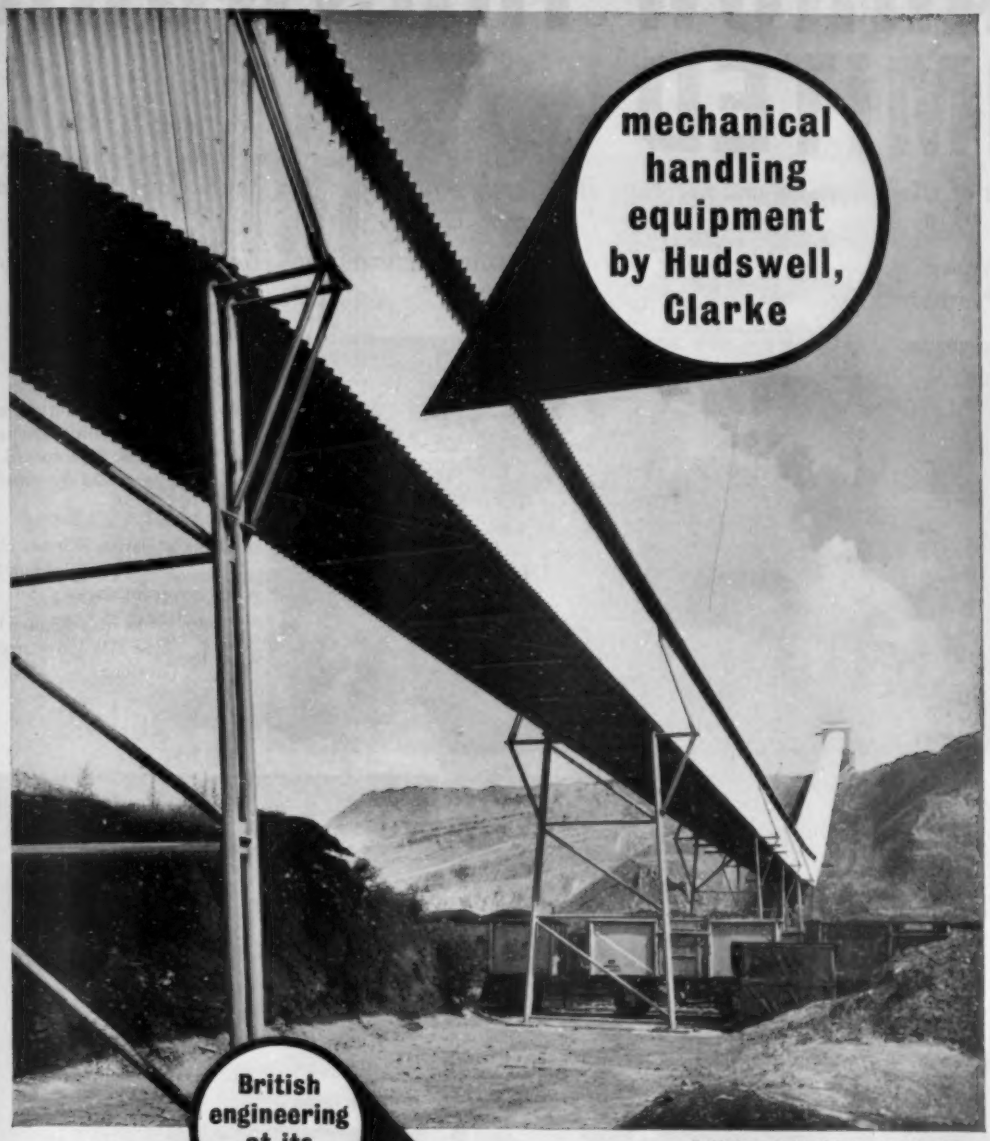
Literature and quotations available by return.

Can be used as interlo sheets to form co tinuous lining, or wi spacers as illustrate
● Low cost ● Non f flammable ● Flexib
● Easily transported a installed ● Recoverab

HOLLYBANK ENGINEERING CO. LTD.

7 PENN ROAD, BEACONSFIELD, BUCKINGHAMSHIRE

Telephone: BEACONSFIELD 142 & 227



By kind permission of the National Coal Board.

Complete dirt disposal scheme at a Colliery in the North of England

HUDSWELL, CLARKE & CO LTD

DESIGNERS AND BUILDERS OF COLLIERY MECHANICAL HANDLING EQUIPMENT

Jack Lane, Leeds, 10. Tel: 34771 (6 lines). Cables: Loco, Leeds.

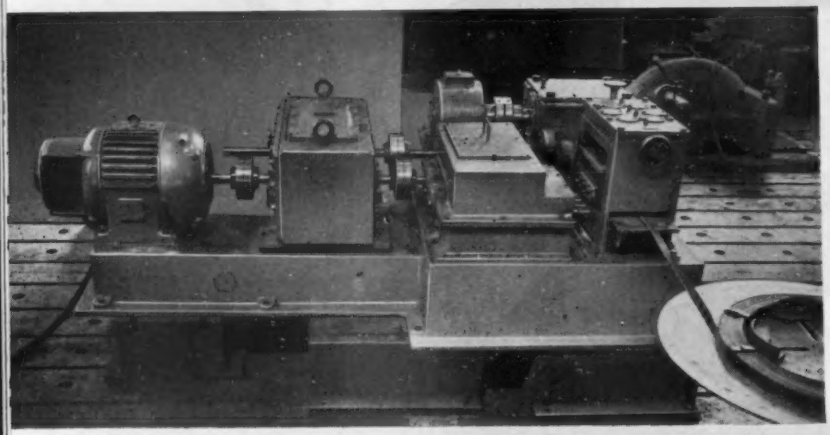
LONDON OFFICE: 14, HOWICK PLACE, VICTORIA ST., S.W.1.

Telephone: VICtoria 6786 · Telegrams: Hudclar, Sowest, London · Cables: Hudclar, London

BARROW IRONWORKS LIMITED

Makers of Blast Furnace and hot blast stove equipment to our own designs and to the designs Messrs. S. P. Kinney (Engineers) Inc. of Pittsburgh, U.S.A.

We produce special machines and prototypes—Manufacturers of High Grade Haematite a Semi-Phosphoric Pig Irons.

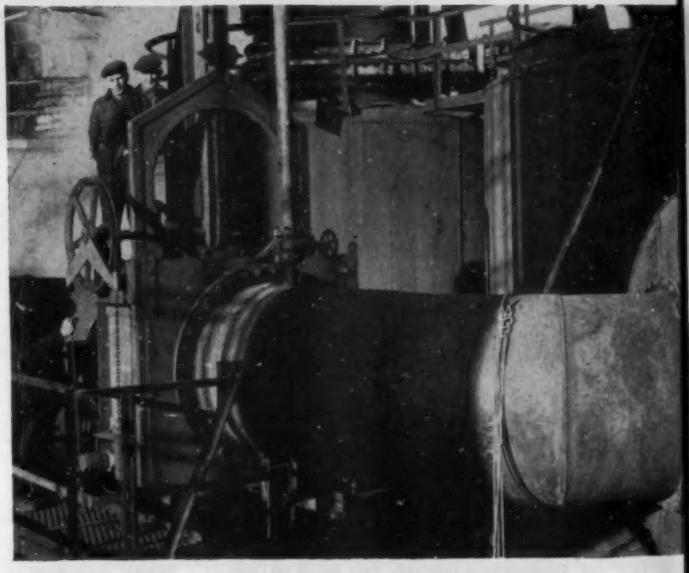


(*left*) Automatic Cutting and Straightening Machine for Barrow Steelworks Ltd. (*reproduced by permission*)

BELOW

(*left*) 4" Barrow-Kinney Heavy Duty Self Cleaning Spray operation.

(*right*) 42" Barrow-Kinney Plate Type Gas Valve erected in position.



BARROW-IN-FURNESS, LANCASHIRE, ENGLAND

Telephone : Barrow-in-Furness 830 (5 lines) Telegrams : Ironworks, Barrow-in-Furness

VISCO

KEEP YOU COOL CALM and COLLECTED

VISCO equipment is specially designed to help you make the most of raw materials, natural resources and manpower. Save money by consulting VISCO.

Cooling

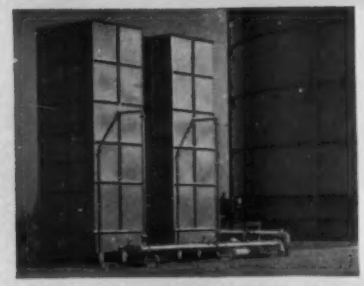
VISCO design and supply Water Coolers of many types including natural and forced draught recirculating systems.

Dust Collection

VISCO Automatic collectors draw off dust at point of generation thus avoiding harmful (or wasteful) liberation.

VISCO ENGINEERING CO. LTD.
Stafford Road, CROYDON
Croydon 4181

Coolers, Fume Removal, Dust Collection

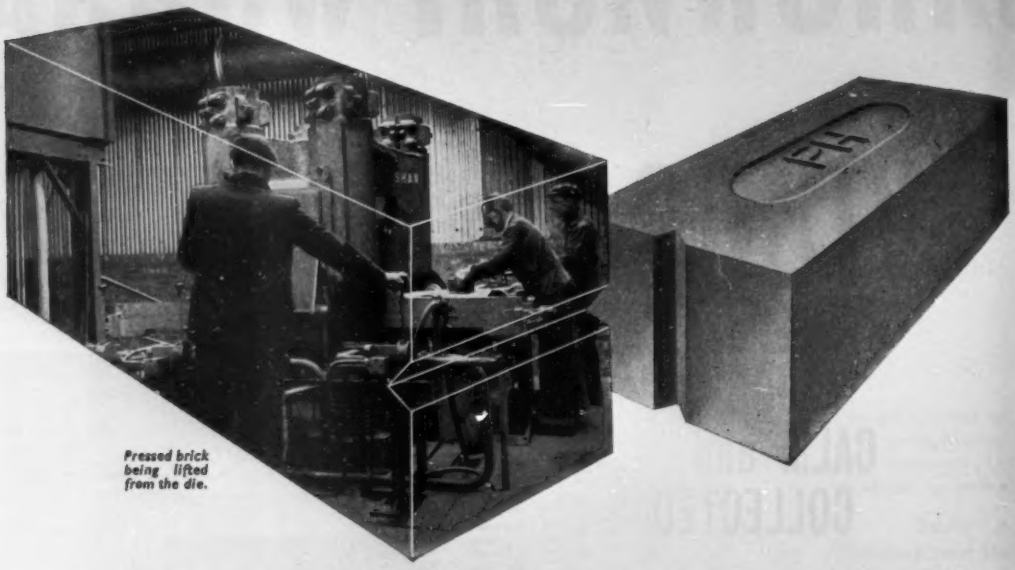


Forced Draught Cooler, Wales Gas Board

Visco-Beth Dust Collector, Tradeston Gas Works, Glasgow

VISCO

FWS



Pressed brick being lifted from the die.

PRESSING PROBLEM SOLVED

Pickford Holland install the latest hydraulic presses for standard and special shapes

Refractory bricks today must be absolutely accurate in size and shape. These qualities, combined with unerring consistency in texture and performance are achieved by Pickford Holland through the medium of the most modern plant and equipment.

In Pickford Holland works, the very latest crushing, grinding and mixing plant, powerful hydraulic presses and continuous tunnel firing kilns have been and are being installed. Rigid control of the various processes is strictly observed, and the finished bricks are carefully inspected and tested before being despatched to the consumer.

More and more Pickford Holland refractory bricks are being supplied to steel and other industries throughout the world and the demand still grows. This surely points to the success of this policy of plant modernisation and is a tribute to the lasting service that these bricks give.

PICKFORD HOLLAND *Refractory Bricks*

Consistent in Size, Shape, Texture and Performance

PICKFORD, HOLLAND & CO. LTD. 381 FULWOOD ROAD, SHEFFIELD 10. TEL: 33921

. . . in the end is what matters, for it is the cutting end of Stag Major steel which pays off. Not just a tip, but a good substantial piece of finest super high speed steel, inseparably fuse-butt-welded to a high grade shank.

A complete tool, hardened and ready for use, for lathe, planer, shaper, etc., at little more than the cost of re-dressing by forging a solid tool.

Send request form for booklet and tool chart.

STAG MAJOR

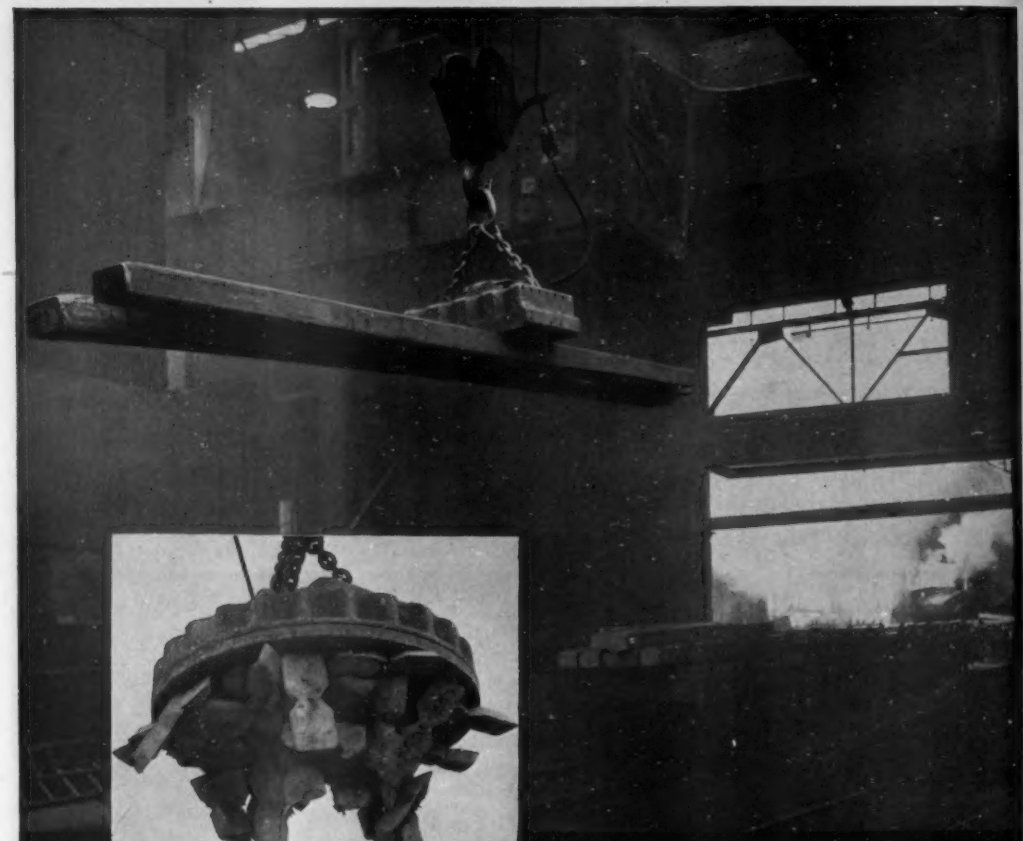
SUPERWELD TOOLS

EDGAR ALLEN & CO. LIMITED
IMPERIAL STEEL WORKS . . . SHEFFIELD 9

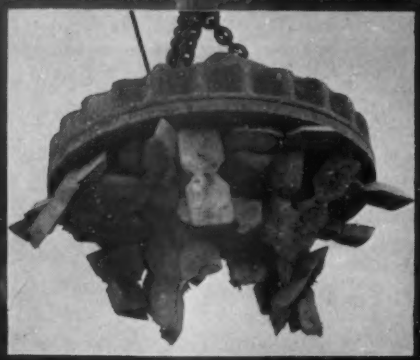
ETD60 ICTR

To EDGAR ALLEN & CO. LTD., Imperial Steel Works: Sheffield 9
Please send "Superweld" booklet and chart to:—

Name .....
Position .....
Firm .....
Address .....



by courtesy of Round Oak Steelworks, Ltd.



Circular, rectangular and bi-polar magnets are part of the wide range of electric magnets made by The General Electric Co. Ltd. Please ask for Technical Descriptions Nos. 315 & 379.

G.E.C. Witton-Kramer lifting magnets

THE GENERAL ELECTRIC COMPANY LIMITED,
MAGNET HOUSE, KINGSWAY, LONDON, W.C.2.

BRITISH STEEL AT ITS BEST

E PRODUCE

BASIC OPEN HEARTH STEEL

UALITIES

CARBONS UP TO 1.0%

DEEP STAMPING AND RIMMING

SILICON AND SILICO-MANGANESE

FREECUTTING

LEAD-BEARING

ZES

BLOOMS	5" up to 9" square
BILLETS	2", 2¼", 2½" 3", 3½" and 4" sq.
SLABS	5" to 16" wide × 2" to 2½" thick.
SHEETBAR	12" wide × ¼" to ½" thick.

Other sizes by request

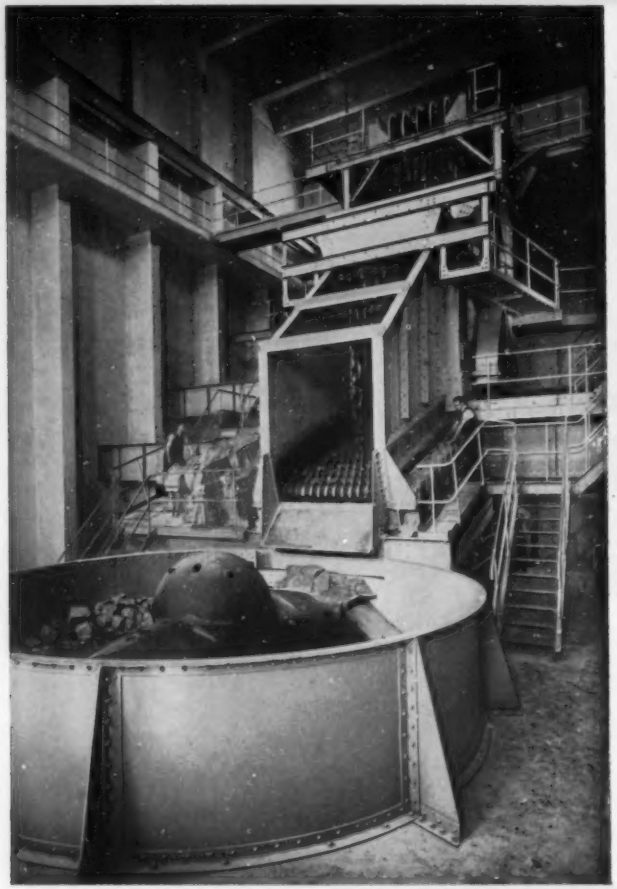
For further particulars please write to us at :

Telegrams :
ght-Scunthorpe'
ne : 2271 (7 lines)

JOHN LYSAGHT'S SCUNTHORPE WORKS LTD.,
Normanby Park Steel Works,
SCUNTHORPE, Lincolnshire.

LYSAGHT'S
SCUNTHORPE

A Member of the GKN



Ross Plant incorporating 54″ gyratory crusher—
Hope Cement Works of G. and T. Earle, Ltd.

MATERIAL HANDLING WITH

ROSS

— Complete material handling plants for ore, stone, coal, slag, etc.

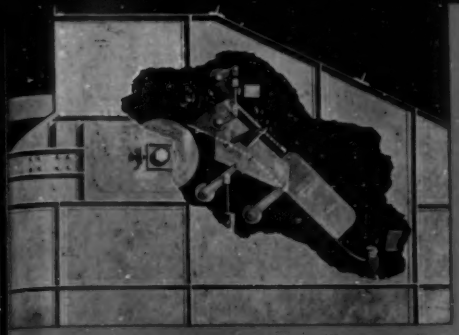
— Plants for primary, secondary and tertiary crushing; screening; wagon handling; stocking and re-claiming.

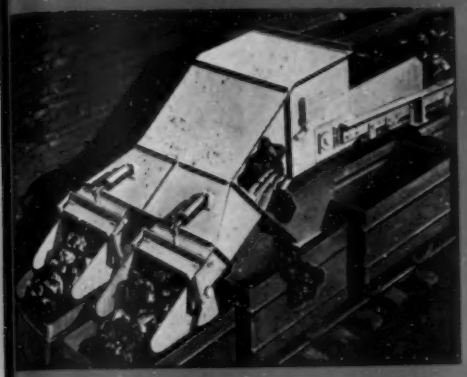
— Services for site survey, planning and layout; detail design; erection; and commissioning.

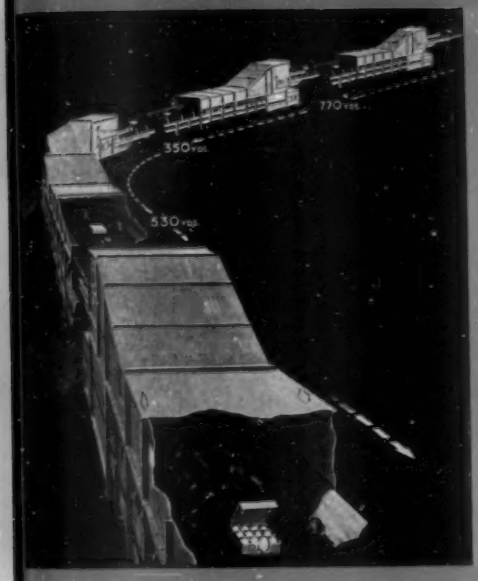
ROSS ENGINEERS LIMITED, 11 WALPOLE ROAD, SURBITON, SURREY

Telephone: Elmbridge 2345

ROSS SCREEN & FEEDER CO., WESTFIELD, NEW JERSEY, U.S.A. C2/3



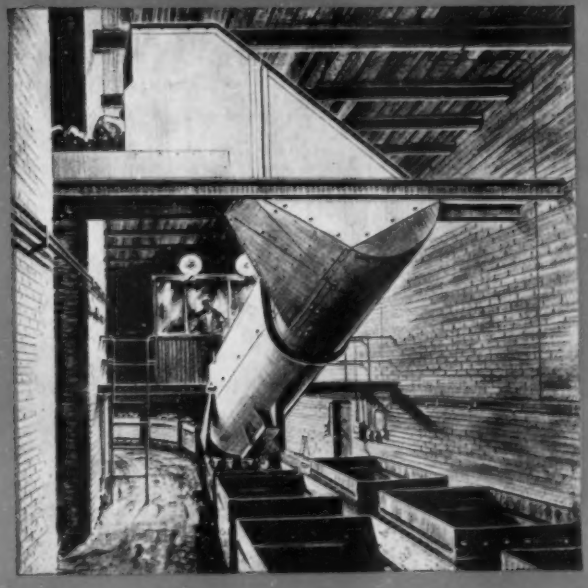




hanmade

ANTI-BREAKAGE Specialists

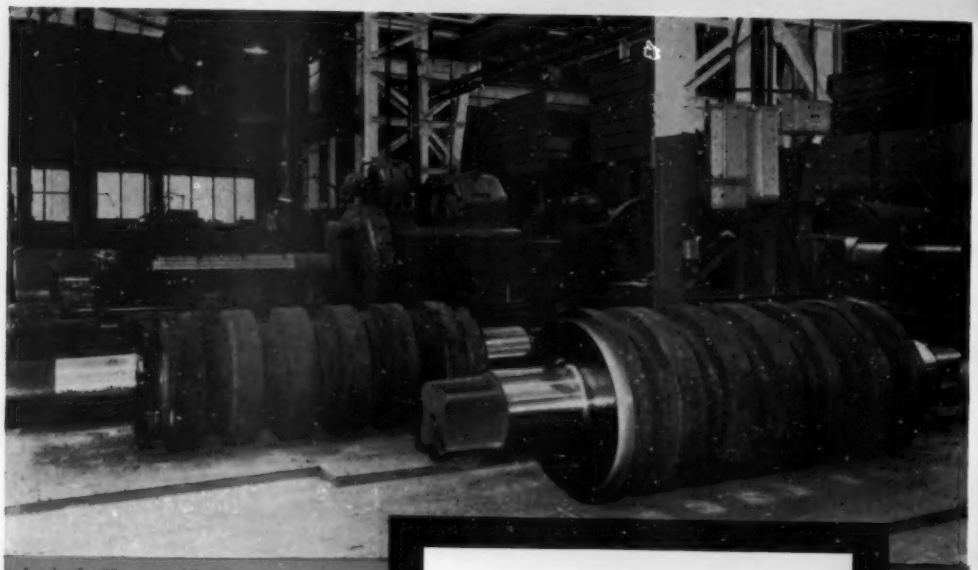
Hanmade equipment is playing an ever increasing part in minimizing coal breakage on underground conveyor systems



Chuckle with Sam

Sam's girl friend thinks that an all-in wrestler is an exhausted athlete.

THE hanmade CONVEYOR CO. LIMITED
Winifred Street . Hucknall . Notts.
Telephone: Hucknall 469



A pair of 31½" centres Alloy Grain Finishing Rolls—weight 21, 280 lb: each.

BRIGHTSIDE
ROLLCRAFT

The Brightside range of rolls for hot and cold rolling is keeping pace with the exacting requirements of the steel and non-ferrous industries at home and abroad.

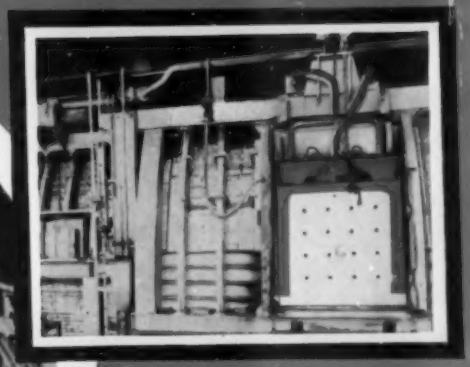
THE BRIGHTSIDE FOUNDRY & ENGINEERING CO. LTD.
G.P.O. Box 118, SHEFFIELD. 1.

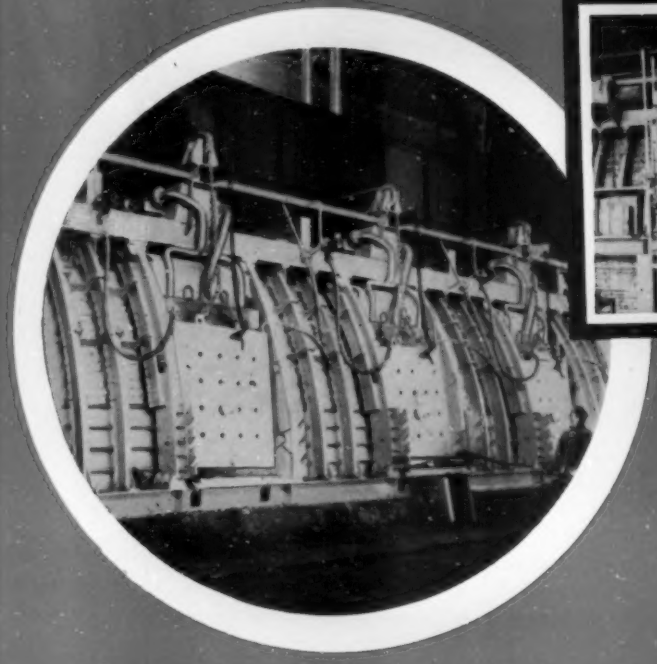
BS 72

Reining Hot Cooling

exclusively applied by S & A increases open hearth furnace efficiency

An evaporative cooling system that can be applied to all types of Open Hearth furnaces without need for modification. Working by the Thermo-syphon principle, it eliminates the need for circulating pumps, reduces cooling water requirements to the furnaces by 50%, reclaims more waste heat, considerably extends the life of door frames, increases furnace availability and will show a capital recovery in approximately 12 months.





As a result of collaboration between Reining and Meerz standardized outside dimensions have been established for both conventional frames & Reining Hot-Cooling frames.

Stein & Atkinson Ltd.

Westminster House Kew Road Richmond Surrey

FURNACE ENGINEERS

Parsons... the answer

to every chain question

ALWAYS LOOK FOR THE TRADE MARK "High Test" Chain

PARSONS CHAIN COMPANY LIMITED, STOURPORT-ON-SEVERN, WORCESTERSHIRE

The man on the spot...

Opts for....

HUWOOD *Slung Structure*

Much of the present-day demand for conveyor structure which can be suspended from the roof has been created by the availability of Huwood Slung Structure—the first choice of a growing number of those mining engineers whose judgment in such matters is sharpened by day-to-day experience.

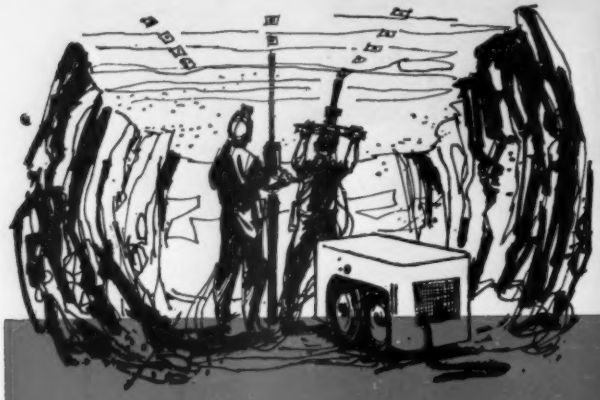
In common with many other Huwood elevated structures for use in gate and trunk roads, Huwood slung structure is based on the F.T. section which is fitted throughout with Huwood self-lubricating oil-filled rollers and is one of the most robust and serviceable conveyor sections used in present-day mining.

HUGH WOOD & CO. LTD.

Head Office and Factories:
GATESHEAD-ON-TYNE, 11.
Grams: Huwood, Gateshead. Phone: Low Fell 76083 (5 lines).

Industrial and Export Office:
ROYAL LONDON HOUSE, FINSBURY SQUARE, LONDON, E.C.2.
Grams: Huwood Stock, London, Phone: Monarch 3273 (4 lines)

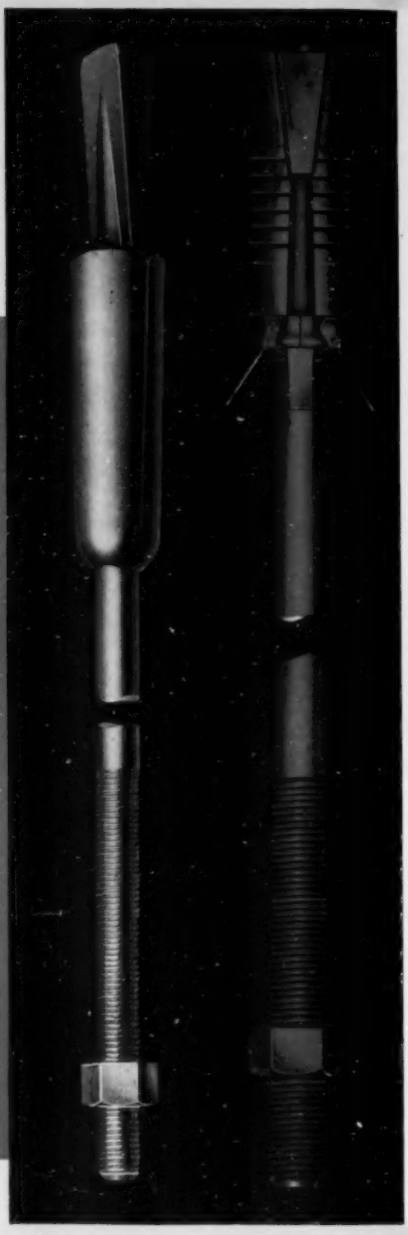
FT/FA/202



FOR SAFETY— AND SAVINGS

Over ONE MILLION (1,000,000!) BJB Roof Bolts are now supporting roofs and lowering costs in mines, tunnels, and excavations all over the country. They provide a permanent means of support and have an unparalleled record of safety. Being quick to install, too, they enable considerable cuts to be made in costs and, for proof of this we have some actual figures available.

We have specialist roof-bolting engineers in all parts of the country who would be glad to help you with your roof support problems.



BJB

GKN

BAYLISS, JONES & BAYLISS LIMITED

HEAD OFFICE: VICTORIA WORKS, WOLVERHAMPTON • TELEPHONE: WOLVERHAMPTON 20441
LONDON OFFICE: 139 CANNON STREET, LONDON E.C.4. • TELEPHONE: MANSION HOUSE 8524

IRON & COAL TRADES REVIEW

JULY 1, 1960

Vol. 181

No. 4,798

ESTABLISHED 1866

Incorporating "STEEL and IRON" and "COAL"

Organ of the National Association of Colliery Managers and the Association of Colliery Managers in India

Published each Friday

Annual Subscriptions: *United Kingdom....52s.* *Abroad....60s.* *Payable in advance*

Editor: F. H. HARLEY

Assistant Editor: P. E. CARDEN

Metallurgical Editor: C. W. J. CRAWFORD, A.I.M.

Mining Editor: H. COOPER, A.M.I.MIN.E.

News Editor: R. M. HOWSE

Associate Editors: B. M. DAVEY, D. GRIMMER

District Representatives:

ERIC PERRIN (North Eastern) Tel.: Whitley Bay 28018

A. D. H. CURRIE (Northern) Tel.: Ringway 2452

E. J. SWEETING (Midlands) Tel.: Piumtree 2585

E. G. COLLIS (Southern Area) Tel.: TRAfalgar 6171

T. H. SMITH (Scotland) Tel.: Dumbarton 1046

Advertising Manager: F. BARRINGTON HOOPER, B.A.

Production Manager: R. J. LOVELL

Publisher: H. J. DWYER

Circulation Manager: E. T. GRIFFITHS

AN INDUSTRIAL NEWSPAPERS PUBLICATION

Published by

INDUSTRIAL NEWSPAPERS, (FUEL & METALLURGICAL) LTD.

Directors:

BARRINGTON HOOPER, C.B.E. *Chairman*

F. BARRINGTON HOOPER, B.A. *Managing Director*

F. H. HARLEY

JOHN HOOPER

V. C. FAULKNER

E. G. WESTON, *Secretary*

JOHN ADAM HOUSE, 17-19, JOHN ADAM STREET, ADELPHI, LONDON, W.C.2

Telephone: Trafalgar 6171 (Private Branch Exchange)

Telegraphic Address:, "Zacatecas, Rand London."

In this Issue—

NCB's REVISED NATIONAL PLAN
Mr. R. H. E. Thomas on Marketing Implications - page 15

IRON AND STEEL BOARD's REPORT
Increased Capital Expenditure Foreshadowed - - page 29

BRETBY CONVEYOR LIFTER
Quick and Easy Elevation - - - - - page 33

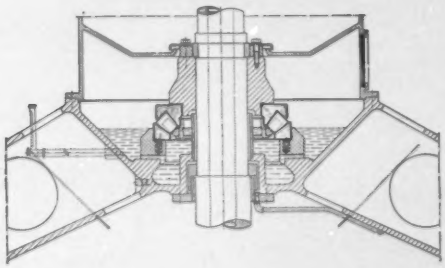
ALL-BASIC OPEN-HEARTH FURNACES
Further Summary of BISRA Conference Papers - - page 35

	PAGE
Leading Article: Coal Exports	1
N. J. Muschamp to Manufacture Hauhinco Equipment	2
Monmouthshire Pit Explosion	2
Questions on State Control of Steel	2
European Coal Trade	3
Coal to Smokeless Fuel Trend Less Pronounced	3
Passing Thoughts	4
£500,000 Order for Toledo Woodhead Springs	4
Board of Sheffield Steel Products Reorganized	4
Dorman Long 3¼ Per Cent. Interim	4
In Parliament	5
Midland Tar Chairman on Changes in Coal Processing	7
Mr. W. E. Duckworth to Head BISRA Division	7
Obituary	7
Mr. H. Southern Becomes First President of SFB	7
Appointments	8
Law Cases	9
Orders Placed	10
The Coal Trade	11
Auchengeich Pit to be Reopened	11
Tribunal Hears Miners' Wage Claim	11
Recruitment Drive for Lancs and Welsh Pits	12
New Coal-fired Stations Can Meet Nuclear Power Cut	12
Coal Mines (Firedamp Drainage) Regulations, 1960	12
Personal	13
Non-ferrous Metals	14
New President of South Wales Engineers	14
Steel Supplies Held Up by Rail Staff Shortage	14
Sheet Steel Import Duty Exemption Extended	14
Book Review	27
GEC Equipment for Indian Copper Mine	28
Swedish Steel Output Continues to Rise	28
Record Blast-furnace Campaign with British Refractory	32
World Standards for Protective Helmets	34
British Drilling Machines for Russia	34
A BISRA Service: Pedigree Irons and Steels for Research	42
New Literature	43
Coalfield News	44
Undistributed Coal Stocks Top 34,000,000 tons	44
Iron and Steel Trade	45
Growth of Austrian Steel Industry	45
British Exhibition in New York	45
Head Wrightson Books More Orders	46
UK Imports Rhodesian Steel	46
Iron-ore Imports	46
Aluminium Mill Housing Cast in Record Time	46
To Aid Machine-tool Research	46
Company News	47
David Brown Regrouping	48
Board Changes	48
News in Brief	49
Imports and Exports of Iron and Steel	50
Exports of British Coal	52
Exports of Coke and Patent Fuel	52
Imports and Exports of Mining Machinery	52
Current Prices of Iron and Steel	54

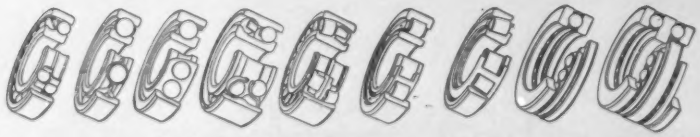
Only SKF *can offer such a wide selection of British made bearings*

The spherical roller thrust bearing has one row of obliquely disposed rollers guided by a high flange on the shaft washer and running on a sphered track on the housing washer. It combines very high carrying capacity with complete self-alignment. The surface of the roller end next to the guiding flange is so formed that the rollers are always separated from the flange by an oil film when under load. The bearing can therefore be used at relatively high speeds, even if the load is very heavy. Unlike other thrust bearings, it can also carry radial loads.

Technical advice on the application of spherical roller thrust bearings, as well as other types of rolling bearings is always readily available from Luton or from any one of the twenty Skefko Branch Offices in the British Isles.



Support bearing for vertical electric generator



THE SKEFKO BALL BEARING COMPANY LIMITED · LUTON · BEDS

THE ONLY BRITISH MANUFACTURER OF ALL FOUR BASIC BEARING TYPES: BALL, CYLINDRICAL ROLLER, TAPER ROLLER AND SPHERICAL ROLLER

GI61

IRON AND COAL
TRADES REVIEW

Vol. 181 July 1, 1960 No. 4,798

Coal Exports

IN 1921, when the British Coal Exporters' Federation was founded, its members succeeded in shipping oversea nearly 25,000,000 tons of coal, despite a three-months' pit strike that year which tended to channel available supplies to home users. In the following year, exports totalled more than 64,000,000 tons, and in 1923 they reached a peak of 79,500,000 tons, plus 18,000,000 tons of foreign bunkers.

The 1923 figures were the highest ever recorded, and have never since been even remotely approached. The 1926 strike, which shut down the pits for seven months, spelled the doom of the British coal export trade as it had been known in the past. A total of 60,000,000 tons of direct exports was registered in 1929, but thereafter the figures fell steadily through the years. Exporters succeeded in selling 37,000,000 tons abroad in 1939, in addition to 10,000,000 tons of foreign bunkers, and the fact that shipments reduced by the war to 1,100,000 tons of exports and 4,400,000 tons of bunkers in 1947 had been raised to 14,300,000 and 5,100,000 tons by 1949 is evidence of the resilience of those engaged in the trade. Those figures were not maintained, and in 1959 Great Britain exported less than 4,000,000 tons of coal direct to consumers oversea.

What of future years? Speaking last week at the third Anglo-European Coal Trade Conference to be held since 1958, the Minister of Power thought that exports of British coal this year would be 1,500,000 tons more than in 1959. The efforts of the British Coal Exporters' Federation in recent years have been devoted to maintaining public and political support for a minimum coal-export trade of 10,000,000 tons per annum, and that is in fact the figure that the National Coal Board lays down in its Revised Plan for Coal as the aim by 1965. Demand for coal both in the United Kingdom and in Europe as a whole is running higher this year than in 1959, and the Minister's estimate of increased exports may well be realized. The British Coal Exporters' Federation is sure that the 10,000,000-ton target can be reached. Indeed, judging by recent statements it may well be looking for a much higher figure, and not too far ahead.

In a refreshingly optimistic pamphlet issued in connection with the Anglo-European conference, the federation points out that the long-term prospect in Europe is not one of coal surplus, but of shortage. If world energy requirements continue to expand at anything like the rate of the years 1900-1960, the end of this century will see overall fuel difficulties close upon consumers everywhere. Supplies of energy are always to be had at a price, but coal and oil are the only versatile low-cost fuels, and the federation takes the view that their pre-eminence in these respects is unlikely to be challenged in the next 50 years. Nuclear power may then be cheaper for electricity generation, but it cannot expect to replace the two older sources of energy over a wide range of essential uses. "The coal tide will turn within a comparatively short time," the Coal Exporters' Federation states. "The fuel surplus we see today is but the ebbing of one large breaker within a gradually advancing tide of demand."

Since British exporters depend for their livelihood on shipments of coal abroad this view of the longer-term future may be shaped by the wish which is father to the thought, but it is nevertheless based on firm premises. As the pamphlet is careful to point out, it is a view which brings little comfort or relief to those coal producers and importers "who have to think in commercial terms and ride each wave which comes, regardless of the state of the tide." It suggests, however, that the current tendency, all too fashionable, of regarding our coal industry as a liability and not one of our greatest actual and potential economic assets may be short-lived. "Once the National Coal Board can throw off its present heavy financial burden of excess stocks, British politicians, press, and public may discover, much to their surprise, that they have now acquired a remarkably efficient, well equipped, and healthy coal industry." These are cheering words, all the more heartening because they contrast so strikingly with the opinions gratuitously offered for our depression by pessimistic politicians and querulous quidnuncs.

What constructive suggestions do coal exporters have to make? They suggest that it is high time to think anew of the contribution which the reviving coal industry should make to the nation's export drive—and to its own future flexibility—by consistent oversea trading through the full cycle of shortage and surplus. There is a hard core of coal exporting which can be justified at all times either because of the financial profit to the board and the nation, or by operational advantages in clearing surpluses of particular qualities at particular times. "That hard core," they say, "must be defined and given the fullest possible service in ways which will convince every customer that these coals are being sold to him not

because such a course is temporarily convenient to the producers, but because it is part of a consistent stable scheme of coal marketing in Europe." To this core should be added from time to time extra tonnages according to developments in the board's marketing policy and trends of demand, and running through the whole process, year after year, must be a consciousness on both sides—at home and abroad—that Britain's coal exports are an invaluable contribution to the European economy.

British exporters are anxious to play a constructive and responsible part in rebuilding the coal shipment trade and restoring to it at least some semblance of its past glory. They retain vital links with buyers abroad which are of great value at the present time, when Britain is going through yet another period of balance-of-payments difficulties, and can be of even greater value in the future. The National Coal Board is no less anxious than the exporters to see a growing tonnage of British coal going abroad, and this dual effort is deserving of every support the Government can give to it. It is fundamental to the future that importers should know and believe that Britain is not only back in the export business, but is back in it to stay. In 1955 and 1956 Britain announced and repeated her decision to abandon coal-export trading. If, because of a turn in the trade wheel which may be only temporary, we make the same mistake twice, we can abandon all hope of maintaining anything more than a trickle of coal exports from British ports.

N. J. Muschamp to Manufacture Hauhinco Equipment

UNDER an arrangement which comes into force today (Friday), N. J. Muschamp & Company, Limited, of Mansfield Woodhouse (Notts) will manufacture, distribute, and service the whole range of Hauhinco mining equipment in Great Britain.

A. Bond (Edinburgh), Limited, will continue to represent Hauhinco, through N. J. Muschamp, in the Scottish, Northern (N&C), and Durham divisions of the National Coal Board.

Tonnage Oxygen Plant for SCOW

LARGEST tonnage oxygen plant serving the iron and steel industry in western Europe is to be installed and operated by British Oxygen Gases, Limited, at the Margam works of the Steel Company of Wales, Limited. The plant will have a capacity of 566 tons of oxygen a day and will enrich by 4 per cent. a total blast volume of 200,000 cu. ft. of air a minute. The final oxygen content of the enriched blast will thus be 25 per cent.

It will be the first tonnage oxygen plant to be used for the purpose in western Europe and the cost is said to be well over £1,000,000.

Monmouthshire Pit Explosion

IN a statement in the House of Commons on Wednesday on the accident at Arreal Griffin Colliery, Abertillery (Mon), on Tuesday, when 45 miners lost their lives and two were slightly injured, Mr. Richard Wood, Minister of Power, said that investigations into the cause of the accident would begin as soon as possible, and he had directed HM Chief Inspector to hold a public inquiry. "Rescue men wearing breathing apparatus, though hampered by two big falls, have already examined almost the whole of the affected area," he said.

The Minister told the House that the Queen had expressed her distress at the accident and had asked him to send her sympathy to those who had been bereaved.

The following telegram was sent to Mr. A. Walsh, deputy chairman of the South-Western Divisional Coal Board, from Sir James Bowman, chairman of the National Coal Board: "My colleagues and I on the National Coal Board are deeply grieved to learn of the explosion at Six Bells Colliery. Please convey our heartfelt sympathy to the relatives of the deceased."

Six Bells Colliery, as Arreal Griffin is now known, is more than 60 years old. It produces principally coking coal for use in the South Wales steelworks. Because the pit has a medium-long life, a modernization programme is being carried out there.

At the pithead a Coal Board official said that the falls of roof which accompanied the explosion had created a tremendous problem. Coupled with the foul atmosphere they had made rescue and recovery conditions very difficult. The accident happened some 1,000 ft. below ground and about 1¼ miles from the pitbottom.

The Six Bells Colliery Disaster Fund has been opened by the chairman of Abertillery UDC and has the support of the County Council and the NUM.

Questions on State Control of Steel

DENATIONALIZATION of steel companies is the subject of two questions to the Chancellor of the Exchequer next Tuesday tabled by Mr. David Ginsburg (Lab.). He is to ask what negotiations have taken place or are contemplated between the Iron and Steel Holding and Realization Agency and Mr. Charles Clore in connection with the sales of any part of the equity of Richard Thomas & Baldwins, Limited.

The second question asks if, in the interests of furthering a property-owning democracy, the Chancellor will consider introducing a statutory restriction on the size of equity shareholding that may be sold or acquired in steel companies yet to be denationalized.

Russians Tour Wire and Rope Works

FOLLOWING visits to Sunderland, and to Scotland, where they visited the Coatbridge (Lanarkshire) works of Martin, Black & Company (Wire Ropes), Limited, a Russian delegation of wire and rope manufacturing experts last weekend toured a firm in the Manchester area. The party is led by Mr. V. A. Smirnov, of the Moscow City Planning Commission.

He said the delegation was not in Britain to buy anything but to get acquainted with this country's wire and rope industry. A delegation from the British rope industry will visit Russia later this year.

EUROPEAN COAL TRADE

"Hard Fight to Maintain Outlets"

"IN domestic heating the European coal trade will have to fight hard to maintain outlets. We must find every possible means to get rid of the physical disadvantages of the old-fashioned ways of using solid fuel in the home," said Mr. Charles Carlow, president of the British Coal Exporters' Federation at the Anglo-European Trade Conference in Guildhall, London, last week. The future of coal, he added, was as much in the hands of the technologists as of the salesman and the producer.

Dealing with the future of British coal inside the European economy, he went on: "It might make a great difference to the prospects for coal in the home if technical advances in boiler and stove construction could produce appliances burning small coals smokelessly, and with automatic control and ash disposal wherever possible. This could bring back coal into profitable tune with the increased standards of home comfort, which would otherwise be met by alternative fuels."

Such advances were proceeding in a number of countries, and it should be remembered that solid fuel burnt properly could be very much less an offender than oil against pure air, a consideration which would become more and more important throughout Europe.

Future in Industry

Turning to the industrial uses of coal, Mr. Carlow said that the European iron, steel, and gas industries presented a mixture of future demand for coal and its coke derivatives. Technologists in the iron and steel industry had achieved a spectacular reduction in the amount of coal needed to produce a ton of steel, but the growth in the need for steel in an age of construction and reconstruction should more than counterbalance technical economies.

The gas industry everywhere was in the throes of a technological revolution, and it was difficult to see any clear pattern of coal demand emerging from the confused interweaving of half-a-dozen new sources of gas supply and contemporary changes in gas-coke usage. The prevailing impression in Europe as a whole was of an active gas industry without any rigid relationship to future demand for gas coals.

As regards electricity and other sources of industrial power, there were more encouraging features. There appeared to be room for all fuels to compete freely within a rapidly expanding market and still leave coal with rising requirements. Prospects for nuclear energy had been over-estimated four years ago, at a time when mounting fuel shortages were foreseen, and there would have to be a striking cost advantage before many countries would be prepared to abandon well-tried conventional methods of electricity generation. His guess was that coal would remain the main electricity fuel for many years.

Mr. Carlow said that within Europe, Britain held many trump cards—much the largest production, almost equivalent to that of the whole of the European Coal and Steel Community put together; an unequalled range of qualities, ideal siting of coalfields, cheap production costs and an efficient rail and shipping system.

"We believe that the British coal industry ought to be able to sustain its own coal export trade through all fluctuations of the market, but the Government's coal export policy at all times should be to secure for British coal abroad those conditions of free and rational trading under which its advantages in production, costs, proximity, transport economies and commercial know-how, can have proper effect."

A prosperous Europe would need British coal, and a healthy British coal industry needed a stable trade with Europe, he said. "We as exporters, with our friends oversea, will do all we can to help these mutual needs find permanent and widening satisfaction."

Coal to Smokeless Fuel Trend Less Pronounced

CHANGE from coal to smokeless fuels has been less pronounced recently, but of the undertaking's trade for domestic solid fuel in the London area, over one half is already for smokeless solid fuels, says Sir John Charrington, chairman of Charrington, Gardner, Locket & Company, Limited, in his annual report.

SIR JOHN CHARRINGTON

The company's one-for-four rights offer at 7s. 6d. per 5s. ordinary share will raise approximately £550,000. This, Sir John states, is required to repay part of the group's overdraft, which at March 31, 1960, amounted to £994,461 (£778,756), and to enable the directors to proceed with development expenditure. During the last three years capital expenditure on replacement and development exceeded £1,500,000, largely in connection with the distribution of fuel oil.

An unchanged dividend of 11 per cent. is forecast on the increased capital for the current financial year.

Chairman and managing director of the Birmingham mechanical engineers, G. N. Kerr (Engineers), Limited, Mr. GEORGE N. KERR, has died at the age of 63. Mr. Kerr served his engineering apprenticeship with Ruston & Hornsby, Limited, Lincoln, becoming its Midland regional manager at Birmingham in 1933. He founded his own company in 1945.

Passing Thoughts . . .

THERE is another social cause for failure among executives which is hardly ever mentioned. This is the increasing round of receptions, dinners, and other engagements which chairmen, directors, high officials, and others now have to add to their normal work.—The Times.

> *If it is to succeed the [shipbuilding] industry will have to overcome its reluctance to recruit managers from outside its own ranks and seek the best people from technical colleges and universities.—The Guardian.*

The Government should take out of the Coal Board accounts that huge deficit. Improvement is made year by year, but it looks so disheartenigly little against that huge accumulated deficit of astronomical millions. It will not be—it cannot be—wiped out in the lifetime of anybody now working in the pits.—Sheffield Telegraph.

> *I warn the Government and the nation that we as a union are not prepared to stand by and see the destinies of our men made the plaything of Parliamentary politics.*—MR. WILL PAYNTER, *general secretary of the National Union of Mineworkers.*

Too many Coal Board officials give deep offence to the general body of miners by not even attempting to establish comradely relations. They live in a world corroded by Tory snobbery and class distinction, and we in the Labour movement have let them get away with it.—MISS JENNIE LEE, writing in the programme for her constituency's Labour gala at Cannock.

> *Nowadays machines do the work that used to be done by men and they can do far more in an hour or in a day, but the machines to balance judgment are still to be invented. Only the human brain can solve the problems and difficulties of management.*—PROF. J. T. WHETTON, *head of the Department of Mining, Leeds University, at the Richard Sutcliffe, Limited, apprentice prizegiving ceremony.*

It should encourage the rank and file of big organizations, and still more the public who deal with them, if more top jobs got to people with a political background. This is largely because the top questions, with which the chiefs of these organizations must deal, are really political questions, even though differences of opinion are often not on party lines.—MR. H. E. GILMOUR in a letter to The Times.

Iron & Coal's News Editor

MR. R. M. HOWSE, who has been appointed News Editor of IRON AND COAL, succeeds Mr. P. E. Carden in that position on the latter's appointment as Assistant Editor.

Before joining the news department of IRON AND COAL four years ago, Mr. Howse had many years' experience in provincial journalism and also in the field of trade and technical publications.

NEARLY 40 mining and surveying students and masters of the Nottingham and District Technical College are spending two weeks on a survey of the Llanfairfechan district.

£500,000 US Order for Toledo Woodhead Springs

CONTRACT to supply 4,000 leaf springs a week for the rear suspension of the 1961 Ford Falcon to the Ford Motor Company, Detroit, has been obtained by Toledo Woodhead Springs, Limited, Darlington and Sheffield. Initially Toledo Woodhead Springs will supply sufficient springs for 400 cars a day. The order is worth a total of more than £500,000 over the two-year period, and it is believed to be the first time that a British company has secured a major long-term contract of this kind in the American motor-car industry. It is understood that after the first three months, there will be the opportunity to double the size of the order. The first shipment is due to leave by the middle of September.

The order was obtained against keen continental competition. It represents an important departure in the policy of the Ford Motor Company in going outside the US in an effort to find components of comparable quality at a lower cost.

The 160 tons of steel a month required will be produced and rolled by Dorman, Long & Company, Limited, and the Darlington & Simpson Rolling Mills, Limited. The springs will be produced in the new factory of Toledo Woodhead, which starts production in about six weeks on the Aycliffe trading estate, near Darlington.

Board of Sheffield Steel Products Reorganized

BOARD of Sheffield Steel Products, Limited, one of the subsidiaries of Arusha Industries, Limited, has been reorganized. Sir Leslie Nicholls is now chairman, with Mr. G. H. Bird managing director, and Mr. K. Nightingale, Mr. L. S. Carstairs, Sir Leslie Hamlyn Williams, and Mr. A. C. Casson (also secretary) as directors. They all become directors of Sheffield Steel's seven subsidiaries with Sir Leslie Nicholls as chairman.

Mr. Carstairs, who is chairman of Arusha, Mr. Bird, and Mr. Nightingale were on the previous board and Sir Leslie Nicholls and Sir Leslie Williams are directors of Arusha. Mr. Bird, who replaces J. T. Henry as managing director of the group, was for many years managing director of Steel Stampings Company, Limited, the main Sheffield Steel subsidiary. Mr. Casson has been with Sheffield Steel for 36 years.

Dorman Long 3½ Per Cent. Interim

INTERIM dividend of Dorman Long & Company, Limited, is being raised to 3½ per cent. (2¾ equivalent) in respect of the year to September 30, 1960. A total equal to 8 per cent. on the capital as increased by a 50 per cent. scrip issue was paid for 1958-59. At the time of the capitalization a total of 10 per cent. for 1959-60 was forecast on the increased capital.

Trading results at the iron and steel works showed marked improvement against those for the same period for the previous financial year. Ingot production increased to 1,159,662 (734,793) tons for the half-year to March 31, 1960. Margins at the engineering works were lower and profits were expected to show a reduction.

In Parliament

FUTURE OF RTB

Pungent Criticisms by Opposition

EMPHASIZING that whatever action the Government took concerning the devesting of Richard Thomas & Baldwins, Limited, and completing the devesting of the nationalized companies in which the Government still held considerable investment, MR. RICHARD WOOD, Minister of Power, told the House on Monday that it was the Government's intention to press on with steel denationalization until it was complete. The Government must be free to exercise its judgment on denationalization timing, but there might be advantages in postponing action over RTB in the light of the company's further development plans.

The debate, one of the liveliest since the General Election, was opened by MR. FREDERICK LEE (Lab.), who said the Opposition was posing a single question: why? He challenged anyone to say that it was because RTB was failing the nation. Not only was it clear that RTB as a nationally-owned section of the steel industry had been demonstrably successful; it was also clear that the attempt to denationalize the industry had been a complete and utter failure. To pretend that the Government intended to denationalize anything but the profits "fairly shrieked of hypocrisy and humbug."

Taken in conjunction with the Steel Company of Wales, Limited, which was an integrated part of RTB, this action represented the greatest carve-up of public assets by private piracy since the sacking of the monasteries, he said. "This is a sordid and despicable transaction. It is not responsible government, it is official vandalism. When engaged in comparable activities Dick Turpin had the decency to wear a mask," he concluded.

Return to Private Enterprise

The Government, MR. WOOD replied, believed that the question of ownership had nothing to do with the effectiveness of public supervision which could be equally if not more effective under conditions of private enterprise. Two elections had shown that public opinion was not enthusiastic about preserving the nationalized structure.

After a stream of interruptions, Mr. Wood continued. He was confident, he said, that the potential performance of the company would not be jeopardized by return to private enterprise. The present development at Newport might be relevant to the timing of the disposal, but it could in no way affect their conviction that the industry should be returned to private enterprise.

It would be neither desirable nor right to specify a detailed programme or a timetable for disposing of Government holdings in industry because a number of factors had to be taken into account—the state of the market, existing demands for different kinds of security, the nature of the undertaking, and the requirements of the Iron and Steel Act, 1953.

Because the demand for sheet steel had grown rapidly, operation date for the Spencer Works of RTB had been brought forward to April, 1962, instead of mid-1963. It was now hoped to improve on that and start production late in 1961. This had increased the company's need to borrow and the latest estimate of cost for the Newport strip mill was £119,000,000 instead of the £110,000,000 estimated a few months ago.

The two main reasons for the increase were that the company would now instal a more powerful continuous mill in place of the semi-continuous mill and the other was acceleration of the project which inevitably involved increases in the civil engineering costs. The Government was considering the best means of making certain that RTB received the finance it required and the House would be informed of any variation in the Ministry's agreement.

MR. JOHN MORRIS (Lab.) said it was obvious the company was going to be thrown to the wolves. The temple today was full of money changers—the speculators and investors—and they were not only in the temple but were taking it down brick by brick, sheet by sheet, and billet by billet to share the spoil among their friends. There had been nothing like it since the Spanish Main, he added. Drake, Raleigh and Capt. Morgan would go down in history as juvenile delinquents compared with the vultures now hovering around ready to pounce on the prospect of the great profits which the industry was going to make.

MR. GERALD NABARRO (Con.) regretted the Government had not disposed of RTB between October and January when it would have obtained a big price and not the relatively depressed price of today. MR. JACK JONES (Lab.) agreed. It proved that a nationalized steel concern could be a wonderful success, he said.

MR. HUGH GAITSKELL (Lab.) began by referring to the disparity in the increase of exports and imports of steel. In the first five months of 1960, he said, imports had risen from £4,500,000 to £18,000,000 while exports went up by £2,000,000. The deterioration in the balance of payments was £11,000,000 or about £25,000,000 a year.

What would the proposed change do? It would alter the distribution of the profits earned, divert dividends into private hands, and it would produce considerable capital gains which would accrue to the new private shareholders. From the viewpoint of the taxpayer the change would be a shockingly bad deal.

What the Government sought to do was simply to provide at public expense more pickings for successful shareholders. The whole procedure was squalid and disreputable and threw into very ill-repute the working of British democracy.

Winding up the debate DR. CHARLES HILL, Chan-

cellor of the Duchy of Lancaster, said British steel prices were thoroughly competitive. There were three price adjustments in the last year or so—all downward and amounting to 2½ to 3 per cent. overall. The Opposition's criticism of the industry as a whole was answered by the facts. Its capacity had doubled between 1945 and 1957, increasing from 11,800,000 tons to 21,700,000 tons and it was now 25,500,000 tons. Weekly average production was rising; output per man was 40 per cent. up since the war; fuel efficiency was 40 per cent. up, and of the £710,000,000 capital investment between 1949 and 1958 £490,000,000 had come from the industry's own resources,

He suspected the real purpose behind the motion was an attempt on the part of the Leader of the Opposition to find a subject on which he could expect some semblance of agreement from his own party. The motion, despite its limited terms, was the stale old line of nationalization all over again.

The motion was rejected by 326 to 241 votes.

Disposal of Precision Engineering Firm

FOLLOWING the announcement in the House last Friday that the price paid for S. G. Brown, Limited, precision engineers, of Watford, was £775,000, the disposal of the company was debated on Tuesday. The sum agreed by de Havilland Holdings, Limited, in association with the US Bosch Arma Corporation, was payable yesterday (Thursday) and included repayment in full of outstanding Admiralty loans amounting to £215,000. The purchasers are also assuming responsibility for a bank overdraft of £440,000.

MR. FREDERICK LEE (Lab.) again attacked the Government for "a disgraceful arrangement" and "a slur and insult to the nation." MR. HAROLD WILSON (Lab.) claimed that it was "a successful piece of public enterprise which was to be handed over to the money-makers. The motive was loot."

MR. C. ORR-EWING, Civil Lord of the Admiralty, replying to Mr. Lee, maintained that it was no function of a Government department to run a limited liability company trading on commercial and competitive lines. If a firm was to progress, a considerable amount of extra capital was needed. The Government could not see why the taxpayer should foot this bill and did not feel it was necessary to carry on at the taxpayers' expense an experiment in Socialism.

Winding up the debate the PRESIDENT OF THE BOARD OF TRADE, Mr. Reginald Maudling, said the Admiralty, the staff, and the taxpayers all gained from the sale, which was in the interests of the workers because the firm would be strengthened as a commercial unit. The taxpayer had received a good price for the assets.

DUMPING OF RUSSIAN FUEL OIL

WHEN MR. WOODROW WYATT (Lab.) asked about the threat to the British coal industry from "imports of cheap Russian oil at the equivalent rate of 500,000 tons a year," MR. RICHARD WOOD, Minister of Power, said that in the year ended last April imports of Russian fuel oil were less than 100,000 tons. These imports were closely controlled by licence and the effect on the coal industry was one of the factors taken into account before a licence was granted.

MR. WYATT replied that the price of the Russian oil was only £5 15s. a ton, and that it was "being dumped with the connivance of the Government at the expense of the coal mining industry."

Asked by MR. DOUGLAS JAY (Lab.) whether he would apply anti-dumping powers to some of this oil, whether from Russia or elsewhere, Mr. Wood said the Government would consider anti-dumping powers if there was evidence of dumping.

VIGOROUS PIT RECRUITMENT

IN answer to MR. WOODROW WYATT (Lab.), the MINISTER OF POWER, Mr. Richard Wood, said that he was confident the National Coal Board would have all the miners it needed in 1965. Many of those now leaving the industry were over 65.

MR. WYATT said that the average age of miners was going up very fast. Owing to uncertainty over the future of the mining industry brought about by the Government, miners were leaving at an ever-increasing rate. Wastage was now 1,500 a week. "The Minister cannot possibly maintain the figures in the Revised Plan for Coal in 1965 if this continues," he said.

MR. WOOD replied that recruiting was now going on vigorously in a number of Divisions, and he was confident that recruiting would make up any manpower wastage which was now taking place in a number of Areas.

NUCLEAR POWER AND COAL

SLOWING down of the nuclear power programme would not materially affect the coal industry's prospects up to 1965, as foreseen in the Revised Plan for Coal published last October, MR. RICHARD WOOD, Minister of Power, said in answer to questions from MR. TOM DRIBERG (Lab.). The effect on subsequent years would be taken into account when the National Coal Board and the electricity industry discussed the latter's coal requirements.

Mr. Wood revealed that the Generating Board planned to bring into operation seven thermal and two hydro-electrical power stations before the end of 1964. The number of new conventional stations to be built between 1965 and 1970 would depend on the growth of demand and on technical and economic developments.

"NO DENATIONALIZATION" PLEDGE

ALLEGATIONS that the Government intended to denationalize the coal industry and secure a return to district wage agreements were repudiated by MR. RICHARD WOOD, Minister of Power. "I would like to make it quite clear," he said, "because I think it is necessary for the future of the industry, that there is no foundation at all in either of these suggestions."

Asked by MR. ROY MASON (Lab.), when he would begin his consultations with Mr. Alfred Robens, chairman-designate of the National Coal Board, the Minister said he thought it would be fair if Mr. Robens were first allowed to take office as deputy chairman and work in the industry for a short time before such conversations took place. A statement on the Government's plans for the future of the coal industry would therefore not be made "for some time."

THE COUNCIL OF ASSOCIATION between the UK and the High Authority of the European Coal and Steel Community had proved useful for discussion of coal and steel problems, said Mr. Robert Allan, Joint Under Secretary of State for Foreign Affairs, but any question of moving into membership of ECSC would have to be considered in the context of a wider European settlement. He was replying to a question of Mr. J. Slater (Lab.).

Midland Tar Chairman on Changes in Coal Processing

POST-WAR changes in the availability and price of coal has compelled the gas industry to exploit other means of production, and technical development in coal processing is veering towards large new plants for total gasification situated alongside the pithead, says Mr. R. B. Robinson, chairman of the Midland Tar Distillers, Limited, of Birmingham, in his annual statement.

The extent of any new technical development, however, was by no means commensurate with the amount of discussion and publicity which it aroused, and it was necessary to preserve a sense of proportion. New methods of gas production would undoubtedly make headway, but the company expected to continue to receive supplies at something like the present rate from orthodox carbonizing plants, which would continue to process coal for a long time to come.

The company made a net profit of £206,805, after tax of £165,551, for the year to March 31, 1960, compared with £120,021 for the previous nine months ended March 31, 1959. A dividend of 12½ per cent. is recommended on the ordinary shares, as against 7½ per cent. for the nine months of 1959.

Mr. W. E. Duckworth to Head BISRA Division

BRITISH IRON AND STEEL RESEARCH ASSOCIATION has appointed Mr. W. E. Duckworth head of the metallurgy (general) division. He has published papers on powder metallurgy, fatigue, wear of metals, and on statistical and operational research subjects, and has a number of patents to his credit on electroplating and sintering processes.

After graduating from Cambridge in 1946, Mr. Duckworth joined the Nelson research laboratories of the English Electric Company, Limited, to study metallurgical problems. A year later he joined British Insulated Callender's Cables, Limited, where he specialized in corrosion and fatigue problems in cables. In 1949 he became research investigator with the Glacier Metal Company, Limited. He was appointed manager of the research department, which included a chemical laboratory, metallurgical and process control sections, and an operational research section, in 1955 and became manager of the operational research department last year.

Mr. Duckworth has recently written a book entitled "A Guide to Operational Research" which is due to be published next year. Prof. G. Wesley Austin is to continue to act as consultant to the metallurgy (general) division.

Steel-powder Blocks Plant in Norway

PRODUCTION of steel powder, which after pressing into blocks is exported, will be the function of a new steel plant which the Norwegian Government, after extensive research, has just pronounced technically possible. Sited at Narvik, in northern Norway, the plant will use Kiruna iron ore from Sweden and Norwegian coke.

It was the idea of a Norwegian civil engineer, Kristoffer Hjellnes, and the initial annual output is estimated at 250,000 metric tons.

Obituary

The death has occurred at the age of 56 of Mr. THOMAS HERBERT SAVEKER, managing director of T. Saveker, Limited, brassfounders, etc., of Birmingham.

Works manager for the past 15 years of John King & Son (Enamellers) Limited, Chesterfield, Mr. ALBERT THEODORE STAFFORD died suddenly at the works. Mr. Stafford, who was 60, joined the firm in 1922.

The death has occurred of Mr. HERBERT GEORGE MADLEY at the age of 83. For nearly 20 years he was one of HM Inspectors of Mines and Quarries. In 1930 Mr. Madley was appointed senior inspector for Monmouthshire and he trained many mining engineers in Wales during his career. He was a prominent member of the St. John Ambulance Brigade.

The death occurred on Wednesday of last week of Mr. G. T. RICHARDS, grandson of the founder of Tilghman's Patent Sand Blast Company, Limited, and Smith & Coventry, Limited. He was 75. His father founded George Richards & Company, Limited, with whom he served his apprenticeship. After three years with Smith & Coventry and Acme Lathe & Products, Limited, he took up motor car designing and in 1908 set up as an engineer on his own account. The following year he was commissioned by Davey Engineering, Limited, to design the "Hewitt" patent valve engine. Considerable work in the field of car and aeroplane design followed.

Mr. H. Southern Becomes First President of SFB

FIRST president of the Society of Furnace Builders has been announced as Mr. H. Southern, the immediate past chairman. The appointment was conferred upon him in recognition of his work for the society during his 16 years as chairman. Mr. Southern, managing director of G. P. Wincott, Limited, Sheffield, is succeeded by Mr. C. G. Pettit, assistant managing director of the Incandescent Heat Company, Limited.

On behalf of the industry Mr. Southern negotiated with the Government at the end of the war on the disposal of surplus furnaces. He also advised on the export of industrial furnaces in the 1947 national effort and on the material shortage in 1948. He was one of the founder members of the Refractory Users' Federation. He is a Fellow of the Institute of Fuel, an associate member of the Institution of Mechanical Engineers, a member of the American Society of Mechanical Engineers, and of the Iron and Steel Institute. He was also a member of the councils of the Institute of Fuel and the British Iron and Steel Research Association.

Unemployed Lowest Since 1956

NUMBER of registered unemployed on June 13 was 305,044, the lowest number since October, 1957, when there were 275,222, the Ministry of Labour stated on Thursday of last week. There are now more vacancies than unemployed.

In May there were 341,176 unemployed, and in June last year 413,311. Expressed as a percentage of the estimated number of employees, unemployment in June was 1.4 per cent., compared with 1.5 in May and 1.9 in June, 1959. Apart from school-leavers, the number wholly unemployed fell between May and June by 33,951.

Appointments

To Head New Hawker Research Centre

DIRECTOR of a new research centre for Hawker Siddeley Industries, Limited, to be established at Stockport (Ches), will be Dr. Joseph Albert Pope, Professor of Civil and Mechanical Engineering at the University of Nottingham since 1949.

DR. J. A. POPE

The centre will provide basic research and development facilities for the heavy diesel engine companies of Mirrlees, Bickerton & Day, Limited, Stockport, and the National Gas & Oil Engine Company, Limited, of Ashton - under - Lyme (Lancs), the boards of which are joined by Dr. Pope. Costing more than £200,000 and equipped with modern laboratory and testing equipment, it is expected to be completed early next year.

Dr. Pope was an apprentice at Boulton & Paul, Limited, structural engineers, of Norwich, and obtained his Ph.D. at Queen's University, Belfast, in 1943 and his D.Sc. from the same university in 1948. The author of many technical papers, and editor and co-author of a collective work on metal fatigue published in 1959, he has been responsible for the past four years for the planning of the new laboratories for the faculty of applied science at the University of Nottingham.

Mr. C. D. GRAHAM, principal of Cannock Chase Mining College for the past six years, has been appointed principal of Aston Technical College, Birmingham.

Mr. F. O. THORNTON has been appointed assistant general manager of Rolls-Royce, Limited. Mr. F. STRAW has been appointed assistant general works manager.

New post of London director of the Aveling-Barford, Limited, group, has been taken by Mr. T. H. B. WHITING. Mr. O. A. SINGLETON has been appointed London and home counties manager of the company.

Formerly secretary of Richard Hill, Limited, and Richard Hill Rolling Mills, Limited, Middlesbrough, Mr. C. W. TAYLOR has been appointed company secretary and group accountant. He is succeeded by Mr. W. ELSDON.

Mr. MATTHEW REID MOORE, who became general sales manager of Richard Sutcliffe, Limited, mining machinery and mechanical handling equipment makers, of Horbury, Wakefield, earlier this year, has been promoted to general manager.

Mr. T. E. HASDELL has been appointed secretary of Hall & Company, coal and building materials merchants, of Croydon. Mr. F. C. H. EDWARDSON, secretary and a director of the company, retires on July 31 after 30 years with the company.

Mr. W. R. GIBB, financial director of W. T. Glover & Company, Limited, a subsidiary of British Insulated Callender's Cables, Limited, and Mr. E. P. G. THORNTON, technical manager (power cables), have been appointed assistant general managers. Mr. Thornton has also joined the board.

Deputy secretary of the research and development department of the United Steel Companies, Limited, Mr. S. N. KINSLEY, has been appointed secretary of the department on the retirement of Mr. GEORGE H. DAVISON. Mr. Davison is to continue to serve in a full-time advisory capacity for the time being.

Mr. K. P. H. JEENS has been appointed manager of the oil industries department at the London office of Worthington-Simpson, Limited, manufacturers of pumps and pumping machinery, of Newark (Notts). Until recently Mr. Jeens was pump and compressor engineer with Stone & Webster Engineering, Limited.

Mr. S. N. KINSLEY, deputy secretary of the research and development department of the United Steel Companies, Limited, has succeeded Mr. GEORGE H. DAVISON, secretary of the department, on the latter's retirement. Mr. Davison, who has been with the company for 27 years, is to continue in a full-time advisory capacity for the time being.

Mr. D. E. SPEIGHT has been appointed to the new post of earthmoving representative by Bowmaker (Plant), Limited, machinery dealers, Willenhall (Staffs). He was formerly the firm's sales representative for Shropshire and North Staffordshire, a position now taken over by Mr. J. W. C. HART, who has been a contractor's agent and engineer.

Mr. GAIL STIFLER has been appointed sales manager, European operation, of the clearing division of US Industries, Incorporated, which manufactures mechanical and hydraulic metal-stamping presses, and has arrangements for the manufacture of its products in England, France and Italy. Previously a senior member of the clearing sales organization in America, he will operate from the company's office in London.

Mr. P. RIGBY has been appointed manager of Houghton Main Colliery in the No. 4 (Carlton) Area of the North-Eastern Divisional Coal Board, and Mr. D. J. STEPHENSON relief colliery manager in the No. 1 (Worksop) Area. Mr. Rigby, who started in the industry as a boy, has formerly managed Mitchell Main and South Elmsall collieries. Mr. Stephenson has been undermanager at Firbeck Colliery in the No. 1 (Worksop) Area since August, 1958.

To Represent Meco in Yorkshire

APPOINTED resident mining engineer to represent the Mining Engineering Company, Limited, Worcester, in the North-Eastern Division of the National Coal Board, Mr. William Nelson succeeds Mr. Rowland Barker, who retired yesterday (Thursday). Formerly Meco representative in the Northern (N&C) Division, Mr. Nelson was born in Leeds and has worked in a number of coalfields. He had gained wide experience as a colliery manager and group manager for some 15 years before joining the company in January, 1957.

He is a member of the Institution of Mining Engineers and a member of the National Association of Colliery Managers.

THE Tube Investments, Limited stand at the British Exhibition in New York, was co-winner with the Worshipful Company of Goldsmiths in a contest to select the best-designed display which had been sponsored by the Goldsmiths Company.

Law Cases

Electricity Charges

BRITISH OXYGEN CLAIMS FAIL

IN a 12,000-word judgment in the Court of Session Lord Guest has absolved the South of Scotland Electricity Board and the British Electricity Authority from two actions raising important principles governing the method of charging for supply of high-voltage current to industrial consumers. The actions were brought by the British Oxygen Company, Limited, and British Oxygen Gases, Limited, which in 1955 purchased from British Oxygen, Limited, the whole of its undertaking at Hillington and Polmadie.

Both companies alleged that, in charging for supply to the two premises, the South-West Scotland Board, and since 1954, the South of Scotland Board, exercised undue discrimination against industrial users of electricity (including the plaintiffs) metered at or above 6,000 V.

Lord Guest said that following a House of Lords' judgment a proof was allowed on averments that the least differential in unit charge which could be given without unduly discriminating against the plaintiffs was 5.55 per cent. increasing as the cost of fuel increased.

Burden of Proof

Whether discrimination was undue was a question of degree and the burden of proof rested on the plaintiffs. The main body of evidence led for the plaintiffs sought to establish that from the point of view of cost of supplying to the consumer, the differential as between high and low voltage consumers was inadequate. If 5.55 per cent. was the proper differential, this was far from establishing that it was the minimum differential. In his opinion this figure could not be taken as a proper differential which the boards were bound to write into every tariff.

The differential was on the basis of a price of coal of 38s. per ton, which was a national price. During the period in question the price never fell below 61s. 10d. and to ascertain the true differential it was necessary to look at the actual price of coal.

Rejecting a claim by British Oxygen Gases that, in respect of a fourth tariff, it had suffered undue discrimination, Lord Guest said it appeared an impossible proposition that the pursuers should be able to dictate to the defendants the form of tariff which they should be offered and that the defendants should be bound to give them the alternative of an annual maximum demand charge without altering the money content in the monthly charge.

Pithead Locker Thief Caught

MINERS in five counties had lost a total of £1,231 in cash and valuables as a result of thefts from colliery lockers by a 23-year-old unemployed labourer, Roy Clayton, it was alleged at Mansfield Magistrates' Court. Clayton, who admitted five thefts from lockers at two Mansfield district collieries and asked for 131 similar offences to be considered, was committed in custody to Notts Quarter Sessions.

Chief Supt. Alan Reddish said the series of thefts was "so rampant" that police in Nottinghamshire, Yorkshire, and Derbyshire, had kept a weekly watch. The Derbyshire executive council of the NUM had asked the NCB for miners on the afternoon shift to be paid on leaving work to avoid running the risk of having further packets stolen. Clayton made weekly visits to collieries, always on Friday, the miners' pay day. He gave the appearance of a miner, carrying a dirty towel under his arm.

When caught at Blidworth Colliery, Clayton at first claimed to have confined his activities to the Mansfield area and said he had only acted in this way since April. But a diary in a hired car parked near the pit told details of raids made by Clayton on pithead baths since the middle of 1958 and gave plans for future excursions. He had noted that in a visit to Bolsover Colliery he obtained over £100—his record for one day.

TEN-YEAR-OLD CLAIM

DEFENDANTS in a claim for damages by a former worker, Mr. John Edwin Bools (43), the Hallamshire Steel & File Company, Limited, were given judgment by Mr. Commissioner Molony, QC, at Sheffield Assizes. Mr. Bools claimed that as an underroller machine operator at the firm's Neepsend rolling mill, his leg was badly injured by a white-hot ingot. He alleged negligence by the company and claimed that if proper guides had been used on the rolling machine the accident would never have happened.

The company denied negligence. The judge and plaintiff were shown, in the judge's room, a film of the rolling mill in operation.

Giving judgment, Mr. Commissioner Molony asked for an explanation why 10 years had elapsed between the accident and the claim coming to court. He said a claim heard 10 years after the accident was "quite out of the ordinary" and added: "The faculty of giving evidence is impaired by the passage of 10 years." There were adequate grounds for the Law Society to make an inquiry.

A written report on the delay is to be given to the Assizes.

WARSHIP EXPLOSION AWARD

DAMAGES of £1,913 were awarded in the Court of Session to a survivor of an explosion aboard H.M.S. Blake while under construction on the Clyde three years ago. Lord Cameron rejected the claim that the accident was caused by workmen making tea with the aid of propane gas equipment. The award went to Mr. John Reid (52), plumber's labourer, who sued the Fairfield Shipbuilding & Engineering Company, Limited, Glasgow.

Four men lost their lives and several were injured

in the accident which occurred in September, 1957. A number of men were burning out air pipes with a burner in an inner compartment of the vessel, and Mr. Reid claimed that the explosion was caused by the ignition of propane gas and air which accumulated in the compartment, the valve of the gas cylinder being defective.

CLAIM OVER LOST EYE DISMISSED

MACHINE setter who claimed damages against Samuel Fox & Company, Limited, steel manufacturers and rollers, of Sheffield, for the loss of the sight of his right eye in an accident at the works had his claim dismissed by Mr. Justice Wallington at Sheffield Assizes.

The plaintiff, Mr. Geoffrey Mansell, said he was called to attend to a machine after a number of wires it was producing had become entangled. He was releasing them when one of the wires jumped out and hit him in the eye. He claimed it was common for wire to jump out of the machine which, he said, "was very unpopular."

Dismissing the claim, the judge said: "This was unforeseeable, and this occasion being the one occasion only, I don't think it was any fault on the part of the company."

JUDGMENT FOR STEEPLEJACK

JUDGMENT against the Steeplejack & Engineering Company, Limited, Nottingham, was given in the High Court when agreed damages totalling £18,764 were awarded to Mr. Bernard Skinner (29) who is paralyzed from the waist down. He fell 250 ft. from a chimney at the Irlam works of the Lancashire Steel Corporation, Limited, in December, 1956.

Mr. Justice Edmund Davies found that the company was in breach of duty in not providing scaffolding at the top of the chimney for the men to work from, but rejected Mr. Skinner's claim that the company was negligent in not providing a safety belt or breathing apparatus.

A stay of execution pending possible appeal was granted.

£331 DAMAGES FOR MINER

DAMAGES of £331 were awarded to a miner, Mr. Michael Naughton (24), against the National Coal Board at Sheffield Assizes, five years after his right arm was trapped in an accident at Darfield Main Colliery (Yorks).

Mr. Naughton, a coal filler, said that acting as a conveyor attendant he was keeping a tray behind a delivery roller clear of coal when he was thrown forward and his arm was trapped between the belt and roller, causing him to be off work for five months.

The judge said he accepted evidence that no protective fence was installed, leaving "an unguarded point of danger".

"AN ORDINARY MINE HAZARD"

CLAIM for damages against the National Coal Board by Mr. Brian Robinson, who tripped over a guide rail at Silverwood Colliery (Yorks), and was left with disabling injuries, was dismissed by Mr. Justice Streatfeild at Sheffield Assizes, who said it was an "ordinary hazard of the mine". There was no negligence on the part of the board, he ruled.

Mr. Robinson said he tripped over one of the guard rails alongside the line carrying the coal trucks. He claimed that the rail had not always been extended to the point where he tripped, and this was a recent addition.

Orders Placed

More Steel Machinery Orders for AEI

HEAVY plant division of Associated Electrical Industries, Limited, is to supply the main drive, consisting of two 2,000-h.p. motors, for a piercer and assel elongator in the seamless tube mill of Tubes, Limited, at Kirby Muxloe, near Leicester. The order, which was placed by Head Wrightson Machine Company, Limited, Middlesbrough, also includes mercury-arc rectifiers and control equipment.

AEI is also to supply a 3,000-h.p. d.c. drive for a finishing stand of the new universal beam mill of the South Durham Steel & Iron Company, Limited. The equipment for the contracts will be made at the AEI works in Manchester, with the exception of the mercury arc rectifiers which will be constructed at the Rugby works.

Together with the recently announced contract for rolling mill drives for Samuel Fox & Company, Limited, Sheffield, these orders are worth nearly £500,000.

CONTRACT FOR a lime-soda plant worth £8,500 has been awarded to William Boby & Company, Limited, water treatment engineers, of Rickmansworth (Herts), by the Distillers Company, Limited, of Edinburgh.

THREE 1,500 kW. pass-out condensing turbo-alternators for the new Shaw Saville liner Northern Star have been ordered from W. H. Allen, Sons & Company, Limited, Bedford, by Parsons Marine Turbine Company, Limited, Wallsend-on-Tyne.

FIVE DEAERATORS for the new Spencer steelworks of Richard Thomas & Baldwins, Limited, at Llanwern, have been ordered from William Boby & Company, Limited, water treatment engineers, of Rickmansworth (Herts), by Parolle Electrical Plant Company, Limited.

A £90,000 ORDER for automatic control equipment for a new zinc smelting plant to be erected at Noyelles-Godault in northern France has been placed with the industrial weighing division of Elliott Bros. (London), Limited, a member of the Elliott-Automation, Limited, group.

ORDER FOR another three AR9 air compressors has been placed with Atlas Copco (Great Britain), Limited, compressed air equipment manufacturers, of Wembley (Middx), by Vauxhall Motors, Limited, for its works at Luton (Beds). Seven of these compressors are already in service at Vauxhall Motors.

Two main reactor rod control boards for installation at the new nuclear power station at Trawsfynydd (Merionethshire), have been ordered from Lancashire Dynamo Nevelin, Limited, one of the Metal Industries, Limited, group of companies, by Atomic Power Construction, Limited. The contract is worth £50,000.

SIX ROTARY DRYERS have been ordered from Head Wrightson Stockton Forge, Limited, by Richard Thomas & Baldwins, Limited. Three of the dryers, each capable of a weekly output of 21,350 tons of ore, will be installed at the Redbourne works and the others at the new Spencer Steelworks, Llanwern. The contract is worth £250,000.

SAN NICOLAS STEELWORKS in the Argentine is to come into operation on July 25. The plant, which has cost over $(US)300,000,000 to build, has an initial capacity of 500,000 metric tons of pig-iron.

THE COAL TRADE

COLLIERY holidays are having less effect on the steady supply of industrial fuels than in previous years and there would appear to be co-operation at all levels to see that a smooth flow is maintained. For what few orders come the merchants' way on the domestic market there is no difficulty in giving prompt attention and there is plenty of scope now for salesmanship.

WEST MIDLANDS

The sale of house coal is maintained and merchants are satisfactorily employed for the time of the year. Best selected coal is fairly fully absorbed at most pits though at some in the northern part of the area there is spare tonnage. All good house coal qualities are in fairly strong demand throughout the area. There is a shortage of coals in grades six and seven although house nuts are difficult to move. Collieries are putting less house coal into stock than was the case last summer and there is a good demand for the well-known premium manufactured fuels.

The demand for anthracite coals is satisfactory, particularly for stove nuts and beans. Much better supplies of second quality anthracites are readily available, while there is little difficulty in securing dry steam nuts. Special purpose fuels are available at short notice. Demand for domestic coke is at an extremely low level.

Although the demand for industrial coals is greater than a year ago, there is no difficulty in securing the qualities nominated by the buyer. The replacement of stock is satisfactory and supplies for the public services present no difficulty.

The demand for hard coke remains patchy. The healthiest section is blast furnace coke, where production just about matches demand. Second rate qualities of hard coke are readily available and hard coke nuts are a very weak section. Requirements of foundry coke are much larger than they were and supplies are not difficult.

LEICESTERSHIRE

House coal during the past week has been in reasonable supply, but there are shortages of certain grades. The insistence of the public generally on particular grades of coal and their disinclination to take any substitute means that for the time being the balance of supplies must be upset to some extent. A pleasing feature of the week has been the larger tonnage of the lower groups of coal coming into local depots, which has enabled distributors to commence stocking to a limited degree. Trade generally for all classes of house coal is reasonably good for the time of the year. Consumers continue to stock anthracite, "Cleanglow," "Warmco," "Phurnacite," and other smokeless fuels, which become increasingly popular as time goes on. Best grades of anthracite now appear to require some notice before despatch. "Phurnacite" remains easy both by road and rail.

Industrial coal supplies under programme are available by both road and rail, and despatches by rail are particularly prompt for all classes of doubles, DS nuts, and singles. Inquiries continue to be received from consumers who, because of increased industrial activity, are installing new appliances, and all inquiries are being met with qualities as requested. Industrial smalls remain a problem.

Auchengeich Pit to be Re-opened

AUCHENGEICH Colliery (Lanark), where 47 miners lost their lives last September in an outbreak of fire, is to be pumped dry and made ready for work. Before the pit was abandoned a water seal was made. On Saturday the seal was broken and samples of the air taken.

Mr. D. Lang, the Area general manager, said on Sunday: "The operations carried out at the weekend to ascertain the condition of the atmosphere in the area abandoned last September were successfully completed and have confirmed that the fire has been extinguished."

The National Union of Mineworkers is to approach the Ministry of Power to introduce new statutory regulations for combating dangerous circumstances similar to those which arose at Auchengeich. This was announced by the president of the Scottish Area of the NUM, Mr. Abe Moffat, after an executive meeting in Edinburgh on Monday at which the union accepted the report of the commissioner prepared after a 10-day public enquiry in January.

Mr. Moffat also said that a crisis was arising because of the number of young miners leaving the industry. The NCB had now been compelled to consider opening recruitment to the industry. While the union would not oppose this, it would insist that priority should be given to redundant miners, miners' sons leaving school, and to former miners who want to return to the industry.

Tribunal Hears Miners' Wage Claim

CLAIM for a 12s. a week increase for about 300,000 day wage men in the coal-mining industry was heard by the National Reference Tribunal in London last Friday. Its finding will be announced in due course. No indication was given about when the tribunal's decision will be made known on the earlier claim by the National Union of Mineworkers for shorter hours for underground and surface workers.

The tribunal is under Lord Justice Morris. The claims were referred to it after rejection by the National Coal Board, which estimates that the cost of the claims would be at least £60,000,000 a year.

New College of Technology at Luton (Beds) which cost £1,000,000 was officially opened on Wednesday by Mr. NORMAN FISHER, principal of the National Coal Board Staff College. The college is being used by nearly 9,000 full and part-time students.

Recruitment Drive for Lancs and Welsh Pits

URGENT need existed in the North-Western and other divisions of the National Coal Board for adequate manpower for the pits, said Mr. Richard Wood, Minister of Power, when he visited the new Agecroft Colliery at Pendlebury (Lancs) last Friday.

MR. RICHARD WOOD

It was announced by a spokesman of the division that a recruitment drive would start in a few weeks for pits in Lancashire and North Wales where the need for manpower was the greatest. Recruitment had been restricted in the division for the past two years, but recently restrictions have been lifted on the recruitment of juveniles.

Mr. Wood said: "Many people have said foolish and exaggerated things about the coal industry. But although it is quite evident that the demand for coal in the future will be on a lower level than it was three of four years ago, the demand is going to be maintained and must be maintained on a high level as far as we can see in the future." By 1965, 80 per cent. of Britain's coal output would come from new and reconstructed collieries and he was convinced there was a big future for the coal industry. The NCB and officials of the North-Western Division were quite optimistic.

The Minister toured the surface of the new colliery, which had just started production from the coal face and which is at present winding over 1,000 tons of coal per week. It is expected that this figure will be doubled in the near future and the colliery will reach its planned output of 4,000 tons per day by 1962. By then the undertaking will have cost about £9,000,000 and will employ more than 2,000 men. Mr. Wood also went to the top of the 174-ft. high No. 5 winding tower and saw the winding engine at work, and then 1,500-ft. down the shaft to the No. 2 horizon and was taken in a man-riding train to a coal-loading point.

The Minister was accompanied by Mr. H. E. Collins, production member of the NCB. He was met at the colliery by Mr. H. W. Barker, deputy chairman of the North-Western Division, Mr. F. G. Glossop, production director, Mr. T. Knowles, general manager of the No. 1 (Manchester) Area, Mr. F. Darley, Area production manager, Mr. R. H. Clough, HM Divisional Inspector of Mines, and Mr. A. D. Nutter, manager of the colliery.

BECAUSE a minority of workers at the Coventry tractor factory of Massey-Ferguson, Limited, have been stopping for tea instead of having it served to them while working, all 4,000 workers are to lose their new 40-hour week from today (Friday). They will revert to a 42½-hour week, work five shifts on nights instead of four, and lose nearly £5 in back pay dated to the start of negotiations for a shorter working week.

New Coal-fired Stations Can Meet Nuclear Power Cut

PROVIDED the Minister of Power gives permission, enough new coal-fired power stations could be built to make good the Government cut in nuclear stations, the Central Electricity Generating Board stated on Saturday. It was also known that in the last year forecasts of load for 1965 and 1966 had been substantially raised, so that on both counts a much more vigorous programme of construction of coal-fired stations was necessary than the board expected a year ago.

Apparently the full cut in nuclear construction was to fall on the Generating Board's share of the programme, which will be reduced from 4,475 mW to 3,175 mW by the end of 1966. Applications were made earlier this year, says the board, for statutory consent for a number of coal-fired plants, including two very large new stations at West Burton and Holme Pierrepont, near Nottingham, each of 2,000 mW capacity—equivalent to four nuclear stations of the largest size so far ordered—and a 1,400 mW station at Tilbury. Tenders for generating plant were already being sought.

Coal Mines (Firedamp Drainage) Regulations, 1960

MADE by the Minister of Power under Section 141 of the Mines and Quarries Act, 1954, the Coal Mines (Firedamp Drainage) Regulations, 1960, which come into operation today, apply to the collecting of firedamp in coal mines before it has been diluted by ventilation and its safe disposal (this process being referred to as "firedamp drainage"). An inspector is empowered to grant exemption if he is satisfied that the safety of persons employed at the mine will not be prejudiced thereby.

The regulations detail the precautions that should be taken and the equipment that should be provided when boreholes are drilled for the purpose of tapping firedamp. The manager of a mine in which a firedamp drainage system containing an exhauster or pressure control chamber has been installed is required to secure the supervision of such apparatus by competent persons appointed by him and instructed in their duties.

Kincardine Power Station Will Need 2,000,000 Tons of Coal

CONSUMPTION of coal at Kincardine power station when all five generating sets become operational will be 2,000,000 tons a year, or roughly one-third of the 1959 output of the East Fife, West Fife, and Alloa Areas of the Scottish Divisional Coal Board, said Mr. G. T. Allcock, Fife Area manager of the South of Scotland Electricity Board recently. He was opening a new electricity sub-station at Kirkcaldy.

There was a likelihood, Mr. Allcock said, of the Electricity Board taking over the NCB generating station at Kelty. In the future a new station would be built in Fife to produce 60 mW from washed slurry coal.

MR. F. M. BENNETT has joined the board of Sir Lindsay Parkinson Company, Limited.

Personal

Eric Perrin Retires

MR. ERIC PERRIN, who has represented IRON AND COAL in the North-east of England for the past 16 years, retired yesterday (Thursday). For almost the whole of this time he had been responsible for an area stretching from Cambridge to the Border, and had not spared himself in maintaining frequent and close contact with the journal's many advertisers, actual or potential, in that important region. He made, in that period, a vast number of close friends, and he and his pipe (a famed antique) were identified with the journal in hundreds of works and offices.

At the beginning of this year he moved his home from Sheffield to the coast near Newcastle, and simultaneously, on medical advice, relinquished his responsibilities outside the counties of Northumberland and Durham. It had been hoped that, under these new arrangements, the journal would have had the benefit of his expert and assiduous services for many years to come, but medical advice again intervened and it was decided, with great regret, that it would be in his best interests to lay down completely the responsibilities he had borne for so long and with such conspicuous success.

All his many friends and acquaintances throughout the country, not least the Directors of IRON AND COAL and his colleagues at John Adam House, will wish him many long years of happy retirement. His present address is 55, Davison Avenue, Monkseaton (Northumberland).

Mr. T. H. SMITH, who has for many years represented this journal in Scotland, will now extend his responsibilities to cover Northumberland and the Tyneside area, while Mr. ALEC CURRIE, at present in charge of Lancashire and Yorkshire, will also take over Tees-side and the major part of the county of Durham. The full services of the journal will continue to be available to all through them.

Mr. JOHN HAMILTON, undermanager at Kennox Colliery (Lanarkshire), who has been in the mining industry for more than 40 years, has retired.

Glasgow University has conferred the honorary degree of LL.D. on Prof. ALEXANDER THOM, Professor of Engineering Science at Oxford University.

London manager since 1946 of Aveling-Barford, Limited, engineers, of Grantham (Lincs), Mr. C. G. MILLER retired yesterday (Thursday). He will continue to act as consultant.

Mr. H. C. RYAN, managing director of the Grantham engineering firm of Aveling-Barford, Limited, has been elected chairman of the Lincolnshire branch of the Institute of Directors.

Among the six senior industrial executives in the Midlands who have accepted to become Fellows of the British Institute of Management is Sir EDWARD THOMPSON, chairman of John Thompson, Limited.

Mr. WILLIAM GOTTS, catering officer of the Durham Divisional Coal Board, has retired. He has been responsible for miners' canteens in the county and for packed meal schemes where no canteens are provided.

Mr. GODFREY STILL (65), longest serving employee of Richard Sutcliffe, Limited, manufacturers of mining equipment, etc., of Horbury (Yorks), retired on Friday of last week. He had been nearly 53 years with the company.

After 20 years as a director of Radiation, Limited, of which his father was a founder director, Mr. KENNETH N. DAVIS has retired. He was formerly chairman of the family business, Davis Gas Stove Company, Limited, Luton.

Medical officer of No. 8 (Castleford) Area of the North-Eastern Divisional Coal Board, Maj.-Gen. G. E. MCALEVEY, who recently retired after eight years' service with the NCB, has been presented with a radio set by the division's medical staff.

Presentation was made recently to Mr. ROBERT LLEWELLYN on his retirement after 48 years' service, latterly as senior member of the estimating staff, with Thomas Bolton & Sons, Limited, manufacturers of copper and copper-base alloys, of Widnes (Lancs).

A presentation was made last Friday to Mr. J. F. CARR, production manager of the Wakefield Area of the North-Eastern Divisional Coal Board, who has retired after 50 years in the mining industry. The presentation was made by Mr. Harold Saul, Area general manager.

On a visit to the UK is Mr. DENIS J. MARTIN, general manager of Warman Equipment Pty., Limited, Australian mining plant specialists. The company, which is interested in setting up oversea organizations in association with businesses already operating in the mining field, designs and builds a range of pumps and other treatment plant equipment.

Caroline Haslett Memorial Trust (general section) has awarded travelling exhibitions to Miss LESLEY S. SOUTER, an engineer in the research laboratories of Associated Electrical Industries, Limited, Harlow, and Miss ROSINA WINSLADE, senior sales engineer with Research & Control Instruments, Limited. The award will enable them to study the training, employment, and prospects of women engineers in the USSR.

Because of ill health, Mr. C. R. PRITCHARD, director in charge of the heavy chemicals group of Imperial Chemical Industries, Limited, resigned yesterday (Thursday). He joined Brunner Mond & Company, Limited, as a chemist in 1926. It was one of the four groups which formed ICI in that year. After serving in various executive capacities in the alkali and salt divisions, he was appointed a director of ICI in 1952.

In recognition of his outstanding service to the Institute of British Foundrymen, of which he was a former president, Mr. FRANK SHEPHERD, personnel manager to the Head, Wrightson & Company, Limited, group, has been awarded the meritorious service medal of the Institute. He is chairman of the training committee of the British Steel Founders' Association, a governor of the National Foundry College, and a member of many committees connected with the Engineering & Allied Employers' Federation.

Chairman of the Incorporated Advertising Managers' Association for 1960-61 is Mr. RAY CREW, of Monsanto Chemicals, Limited, chemical manufacturers, of London, S.W.1. Mr. N. R. A. BILES, of C.A.V., Limited, electrical and fuel injection equipment manufacturers, of London, W.3, is vice-chairman, and Mr. E. P. COLLINS, of the Morgan Crucible Company, Limited, of London, S.W.11, is hon. secretary. Mr. ROY BAGOT, of Kelvin & Hughes, Limited, scientific instrument manufacturers, of Ilford, Essex, is Press secretary.

Council of the Society of British Aircraft Constructors has elected Sir GEORGE DOWTY as president for 1960-61. He was vice-president of the society in 1958-60 and is founder, chairman, and managing director of the Dowty Group, Limited. The original company, Aircraft Components, Limited, was founded by him in 1931. Mr. H. GEORGE NELSON was elected vice-chairman. He is managing director of the English Electric Company, Limited, chairman of English Electric Aviation, Limited, and deputy chairman of D. Napier & Son, Limited, and other subsidiary or associated companies of the group.

Non-ferrous Metals

New International Tin Agreement

TIN is very much in the news because the draft of the new International Tin Agreement, which is to come into force next year, was unanimously approved at the United Nations Tin Conference at the end of last week after a month of secret negotiations.

In general terms, there are no surprises. The tin buffer stock is to be fixed at a maximum of 20,000 tons, instead of 25,000 tons as in the present agreement, and Bolivia's share of the export quota in terms of percentages is being reduced from 19.4 to 18 per cent. The percentages of all other countries is to be increased accordingly.

The US and Russia continue to remain outside the agreement, but Japan and western Germany have decided to join the new agreement which will run for five years from July 1, 1961. However, before it comes into force, the agreement has to be ratified by at least 15 member countries of which not less than nine must be consumers.

In London the market has been patchy since the rise in the Bank rate, although continental interest has revived somewhat. In New York the market is reasonably good and the price not far short of $1.02 cents per pound.

The copper market in London is still mainly governed by news from the Belgian Congo which at present is reasonably hopeful and this has been an important factor in causing prices to ease.

The US market for copper remains essentially unchanged. The price still stands at 33 cents a pound for both custom smelters and producers. However, the custom smelters' intake price for scrap was increased last week in two successive stages by a total of ¼ cents a pound to 25 cents a pound.

Lead continues to be a featureless market on both sides of the Atlantic. In London, the price drift continues and the quotation is now fluctuating narrowly around £71 a ton. There is now less talk of foreign metal reaching the UK. The New York price is unchanged at 12 cents a pound.

Zinc is also featureless in London and in New York. In London the price is now down to around £90 a ton while in the US it is unchanged at 13 cents a pound. In the US those who are seeking greater protection for domestic lead and zinc producers are trying to get legislation through Congress which would institute additional tariffs if prices fell below 13½ cents a pound for lead and 12½ cents a pound for zinc.

Official metal prices in London yesterday (Thursday) were:— Copper, Standard: Prompt £256 10s., forward £246. Tin ,Standard: Prompt £806, forward £796. Lead: Prompt £71 10s., forward £72 15s. Zinc: Prompt £90 12s. 6d., forward £90.

ORE IMPORTS RISE

IMPORTS of iron and manganese ores during May indicate a considerable rise in consumption. At Teeside, 329,416 tons were unloaded in May, while a further 59,900 tons were unloaded at Hartlepool.

The British Iron & Steel Corporation (Ore), Limited, states that it hopes to maintain these figures throughout the summer months.

New President of South Wales Engineers

THE South Wales Institute of Engineers has elected Mr. Christopher Charles Bleach as president for 1960-61. He joined the institute in 1936, was elected to the council in 1949, and in 1958 was vice-president. He is a past national president of the Association of Mining Electrical and Mechanical Engineers, and a member of the Institution of Mechanical Engineers, Institution of Electrical Engineers, the Illuminating Engineering Society, and the Whitworth Society.

Mr. Bleach, who began his career in 1911, has served with Johnson & Phillips, Limited, and William Angus Scott & Partners, Limited, both of Cardiff, and as chief electrical engineer to the Doncaster Colliery Association, Limited. In 1935 he spent a year as commercial engineer (mining section) with the Yorkshire Electric Power Company, Limited, Leeds.

From 1936 until his retirement last month, Mr. Bleach was general manager and then managing director of the Concordia Electric Safety Lamp Company, Limited, and of its subsidiaries and associated companies. He was also a director of the Rimmer Manufacturing Company, Limited, and of Sargrove Electronics, Limited.

Steel Supplies Held Up by Rail Staff Shortage

SUPPLIES of steel urgently required by works in the Birmingham district have been standing idle for weeks on wagons in sidings in South Wales because British Railways in the Midlands are so short of staff, it is reported.

A shipment of 10.000 tons of steel to Newport from America to make up the shortage of home-produced steel was rapidly discharged from the ship at Newport docks and loaded on to wagons, but the railways in the Midlands refused to accept it.

A British Railways official at Newport said last week that there was a complete stop on all types of traffic for the Birmingham district, due to staff shortage. Firms were being advised not to load traffic for destinations in that district, but it was hoped to move some of the steel wagons within a few days.

Another large shipment of steel is expected shortly, and it is likely that all the previous shipment will not have been cleared from the area by then. A British Railways official at Birmingham said it was hoped to lift the ban within the next few days.

Sheet Steel Import Exemption Extended

TEMPORARY exemption of duty on imports of sheet steel, which has been necessary to supplement the supplies available from UK strip mills, has now been extended by the Treasury until July 1, 1961. The exemption of duty on certain iron or steel coils for re-rolling has also been extended to the same date.

In addition, the Treasury announced on Tuesday that it had temporarily exempted from import duties certain chemicals, certain iron or steel rods in coils, and a few other items.

MR. J. M. GRAMMER

MR. J. M. GRAMMER

MR. JOHN MURRAY GRAMMER, director-general of the purchasing and stores department of the National Coal Board, spent all his business career in the gas industry until he was appointed to his present post—a new one recommended by the Advisory Committee on the NCB's reorganization presided over by Sir Alexander Fleck—in July, 1955.

Aged 48, Mr. Grammer became an articled staff pupil with the Gas Light & Coke Company, London, in 1928, and after four years on the gas supply side, was posted to the special services section. From 1936-39 he was deputy officer-in-charge of the company's training, and during this period was senior lecturer in gas engineering (supply) at Westminster Technical College, where he also taught after the war. In 1939, Mr. Grammer was service manager of the company's Eastern division, but on the outbreak of war was seconded to the distribution department. He joined the REME in 1941 and attained the rank of Major and General Staff Officer II. While on demobilization leave in 1946 he was called to the Bar at the Inner Temple.

On his return to the Gas Light & Coke Company, Mr. Grammer was appointed service manager with the Central division, transferred as deputy stores buyer in 1947, and was appointed stores buyer, which position he continued to hold in the North Thames Gas Board. Subsequently he was appointed controller of services.

During 1954-55, Mr. Grammer was chairman of the London Branch of the Purchasing Officers' Association and is a member of that organization's council and national education and economic survey committees. He is a member of the Institution of Gas Engineers, and the Institute of Fuel, an associate member of the Institution of Heating and Ventilating Engineers, and an associate of the Institution of Mechanical Engineers.

To face page 15

Coal Marketing Implications of the REVISED NATIONAL PLAN

By R. H. E. THOMAS*

In this paper, presented at the annual conference of the National Association of Colliery Managers at Southport on June 3, the author emphasizes that the implications of the revision of the National Coal Board's plans for the future are substantial. Mr. Thomas examines a number of factors which will shape the markets of the future, and considers the steps that must be taken by the industry. The consumer, for his part, will choose the fuel which will give him his unit of heat or pound of steam most conveniently and economically. Mr. Thomas concludes: "It is up to us to see that he chooses coal."

THE National Coal Board's original national plan, which was published in 1950, and the first revision, published in 1956, were both directed towards increasing the capacity of the coal industry. In the changed conditions of today it is no exaggeration to say that marketing considerations have played the decisive part in the framing of the current revision, "Revised Plan for Coal." More than nine years have elapsed since the publication of "Plan for Coal," and it is not therefore surprising that there should have been considerable changes in outlook in that time, particularly when it is considered how much the present situation of the coal industry differs from that of 1950. Indeed, looking back to the original plan, it is remarkable how reasonable its statements and total estimate of inland demand now appear.

"Plan for Coal" 1950

When the National Coal Board took over control of the coal industry of this country in 1947 it became responsible for an industry which had been in a state of decline for many years, an industry which was underdeveloped and technically unprepared. The most urgent task was the reconstruction and modernization of the mines in order to reverse the long-term trend. It was very far from being an easy task, but "Plan for Coal" outlined the board's programme for the reconstruction of the industry; in its own words it settled "a strategy for investment."[1]

The problem of estimating the future size of the industry presented formidable difficulties. "At the outset, the board was faced with a series of circular arguments. Thus the future demand for coal depends upon price . . . ; price turns on costs of production and delivery; costs on how much coal has to be produced, of what kinds, and where, which in turn depends on the demand."[1] The plan was being drawn up at a time when there was only limited experience of post-war conditions, and when those conditions, particularly the rapid rise in industrial production, the growing demand for coal, and the existence of controls, were markedly different from pre-war experience.

Even so, a serious and thorough attempt was made to assess the likely demand for coal as far ahead as the period 1961-1965. It is interesting today to look at the estimates of demand then made, in the light of all that has happened since. The board estimated that in the period 1961-1965 it would dispose of between 230,000,000 and 250,000,000 tons a year in markets at home and abroad. The plan was, in fact, based on an output of 240,000,000 tons, the midpoint of this range.

Today, of course, the estimate seems high, but this is due to the inclusion of a very substantial tonnage for export sales. The export demand (including bunkers) was placed at between 25,000,000 and 35,000,000 tons—not so unreasonable when it is remembered that it amounted to nearly 20,000,000 tons in 1949 and more than 45,000,000 tons in 1938, the last complete year before the war. It was thought that inland demand might amount to between 205,000,000 and 215,000,000 tons, which must now seem a remarkably good estimate. A straightforward projection of post-war trends would have indicated a demand at the top of this range, but it was by no means certain that coal consumption would continue to rise at the immediate post-war rate. As the plan

* Member for marketing, National Coal Board, until his retirement yesterday (Thursday).

said: "There are many economies to be reaped from better fuel utilization; and the full impact of competition from oil has not yet been felt in the post-war world."

"Plan for Coal" was not a rigid timetable for action in the industry over a 15-year period; it was not, and it could not be, an attempt to settle the future of the industry. It was stressed both at the time of publication and in the plan itself, that it was a flexible programme that would need frequent revision.

1950 to 1955

The years that followed the publication of "Plan for Coal" were marked by a strong and rising demand for coal. Inland consumption, which amounted to about 203,000,000 tons in 1950, reached 215,000,000 tons in 1955, and in only one year in this period did consumption fail to rise. The industry was extended to the utmost in the effort to meet the ever-increasing demands upon it. It was necessary for the Government to maintain controls over supplies to home consumers, while it was impossible to export all the coal which could have been sold abroad at very favourable prices. Indeed, towards the end of the period it was necessary to import considerable tonnages from abroad. In 1955, more than 11,000,000 tons of coal were imported.

The Ridley Committee, set up to examine national policy for the use of fuel and power resources, reported in 1952. Its conclusions were important because, in conjunction with the recurrent increases in demand, they undoubtedly had a substantial influence upon well-informed views of the size of the coal industry that would be needed in the future. The Ridley Committee estimated that, at the time it presented its report, UK coal output fell some 15,000,000 or 20,000,000 tons a year below demand (including all the coal it would have been possible to sell abroad).

In assessing demand in the years 1959-1963, the committee came to the conclusion that it would be substantially higher than the estimate used in "Plan for Coal." It accepted the NCB estimate of export demand, but put inland consumption at over 230,000,000 tons a year, and as a result suggested that the industry would need to produce some 260,000,000 tons a year in 1959-1963. It is perhaps worth noting that the committee's estimate of oil requirements for inland consumption in this period was 14,000,000 tons a year of coal equivalent[3].

Thus, not only was the current situation one of shortage, but authoritative study indicated that the shortage was likely to be a permanent feature of the years that lay ahead.

"Investing in Coal" 1956

The experience of the years 1950-1955 showed the true magnitude of the problems involved in carrying out the large-scale and intensive reconstruction of the industry while at the same time seeking maximum production. There was the need for developing more engineers of high calibre to handle the work of colliery reorganization; there were problems—very serious problems arising from the availability and distribution of manpower during times of full employment. There were also rising prices. A detailed, pit-by-pit, revision of the board's plans was therefore begun in 1955 and published as "Investing in Coal" in 1956.

As might be expected, "Investing in Coal" was very largely concerned with the problems of production; it was drawn up on the basis that "this country needs all the coal that can be produced within reasonable economic limits."[2] Shortly before its publication the Minister of Fuel and Power had said that inland demand for all forms of primary fuel might exceed 300,000,000 tons of coal equivalent in 1965 (compared with 250,000,000 tons in 1955), and although the use of oil was expected to grow rapidly, and nuclear power could be expected to make a contribution, it seemed as if the demand for coal would only be met with great difficulty.

The board believed that it would be possible to produce 240,000,000 tons of coal a year by 1965, including a contribution of 10,000,000 tons from open-cast operations. By 1970, an output of 250,000,000 tons might be attained.

The view that the industry would be required to get every ton was not confined to the National Coal Board. It was very widely held. Speaking in the House of Commons in May, 1956, the then Minister of Fuel and Power, Mr. Aubrey Jones, said: "For as long ahead as it is useful for us to peer, we shall need more coal than we are now getting,"[4] and later: "When all is said and done in the shape of fuel economy, let us not blink the fact that we are still faced with a most formidable production problem."[4] Speaking in the same debate, Mr. G. Nabarro said: "We are not likely to have enough coal mined from indigenous sources during the next decade . . . [after doubting the attainment of the target]. Compare the 240,000,000 tons which the board says it will get by 1965 with the total energy requirements of the nation, which are 25 per cent. per year higher in 1965 or 300,000,000 tons of coal or coal equivalent a year, and the gap will only be met in part measure, as to 5,000,000 tons of coal equivalent available from atomic energy and certain additional contributions from oil. There will still be a wide gap, evidently to be met by further large-scale imports of foreign coal."[4]

Situation Since 1956

Nineteen fifty-six was in fact the year of peak demand for coal: inland consumption and exports together amounted to 228,000,000 tons. The post-war trend was reversed in 1957, when inland consumption and exports were some 7,000,000 tons less than in 1956. This was followed by a fall of 13,000,000 tons in 1958 and a further fall of 13,000,000 tons last year. The market situation thus changed out of all recognition in a very short space of time, and in doing so set the industry some very difficult problems.

The reasons for the sudden change have been

very widely discussed; it seems clear that a number of factors acting together were responsible, although it is not easy to disentangle their separate effects. The slackening in industrial growth and subsequent recession undoubtedly played a part. The index of industrial production (1954 = 100), which stood at 106 in 1956, rose one point in 1957 and fell back to 106 in 1958. Although in general the recession was thus mild, the effects on certain of the heavy industries, such as steel, bricks, and cement, which by and large are also heavy users of coal, were considerable. The steel industry, for instance, experienced sharp falls in demand and production in 1958, and did not recover until well into 1959, by which time expansion in lighter industries was well under way. The effect on demand for coke and coking coal was particularly important.

A second factor was the weather, variations in which can have substantial effects on demand for fuels. The year 1956 was an exceptionally cold one; the weather since has been milder, and in 1959, which was the warmest year for 10 years, average temperature was 3.1 deg. F. higher than in 1956. This alone accounted for not less than 5,000,000 tons of the drop in demand.

It is clear that two other factors which contributed to the fall in demand will have more permanent effects. The first of these is the progress made towards greater fuel efficiency. Although it is not possible to quantify the effect this movement may have had, it appears from some of the large industries where figures are available that it was considerable. The iron and steel industry is one example. The blast-furnace coke rate per ton of pig-iron produced, which stood at 19.7 cwt. in 1956, fell by 0.8 cwt. in 1957 and 1.0 cwt. in 1958, and it seems likely that there was a further reduction of 1 cwt. or more in 1959, a total approaching 3 cwt. in three years. These figures must be compared with a total reduction of 1.3 cwt. in the period 1949-1956[5]. The Iron and Steel Board has estimated that had there been no improvement in efficiency in 1958, coke consumption at blast furnaces would have been greater by 650,000 tons[6]; there must have been a similar and larger economy in 1959. In the electricity industry, average thermal efficiency rose from 24.9 per cent. in the year 1956/57 to 26.1 per cent. in 1958/59[7]. In the gas industry overall thermal efficiency rose from 75.7 per cent. in 1954/55 to 77.7 per cent. in 1958/59[8]. In industry, the work of the National Industrial Fuel Efficiency Service has in many cases produced fuel savings of 20 per cent. and more.

Secondly, there was the rapid increase in the use of oil fuels. There can be little doubt that the development of oil competition—by itself—would have had a profound influence on the market, and it carries very serious implications for the future. In 1956, oil delivered into markets where it was in competition with coal amounted to rather less than 16,000,000 tons of coal equivalent (at a parity of 1.7 tons of coal to 1 ton of oil). Despite the restrictions of 1957, following the Suez episode, this had risen to some 30,000,000 tons of coal equivalent by 1959. There was a substantial increase in oil consumption in every major sector of the market during this period. A large part of the increase, however, took place at power stations, where oil the equivalent of more than 7,000,000 tons of coal was used in 1959 compared with about 700,000 tons in 1956. The plans to use oil for electricity generation were drawn up, as a result of Government advice, at a time when a shortage of coal seemed likely, but in fact they came into operation when the demand for coal was slackening. A similar, though less spectacular, development has occurred in the gas industry. The Report of the Minister of Fuel and Power on Gas of 1955 stated that: "In accordance with his general view that proportionately more of the country's growing energy requirements will have to be met by oil, the Minister has encouraged the use of oil in gas manufacture."[9] Between 1956 and 1959, deliveries of oil to the gas industry expanded by nearly 75 per cent.

In addition, oil made very substantial inroads into the industrial market, deliveries increasing by about 50 per cent. between 1956 and 1959.

The effect of these changes was to make the market highly competitive, more highly competitive indeed than at any time in the industry's history. The competition in the fuel market before the war was between concerns which had, by and large, similar products to sell; the current competitor is a rival fuel which has, in certain uses, advantages that must not be minimized. After many years of shortage, and consequent control, coal had to be sold in an open and competitive market. The readjustment required was considerable. Not only was it necessary for the board to take steps to meet the current situation without damaging the future capacity of the industry; a revision of plans for the future was also required. A revision of the board's plan was undertaken and published in 1959 as the "Revised Plan for Coal."

"REVISED PLAN FOR COAL," 1959

In preparing the "Revised Plan for Coal," the board first made an estimate of the likely level of demand for coal in 1965. The production measures contained in the plan are framed so as to meet this demand as efficiently as possible.

The Government estimate of this country's future requirements of fuel and power in all forms was given by the Paymaster-General in the House of Commons in July, 1959. He said: "I still think that it is reasonable to take 300,000,000 tons [coal equivalent] as a rough figure for the total energy demand in the middle 1960s. The amount that the coal industry will secure will depend on its competitive position."[10] The board must aim to maintain sufficient capacity to meet a demand for coal consistent with the overall estimate made by the Government, making a reasonable assessment of the share in the energy market that will be met by coal.

In drawing up its estimate of demand the board

consulted four main groups of consumers—the electricity, coke-oven, and gas industries and the railways which together will require approximately 60 per cent. of total output. Detailed surveys were made of the remaining sectors of the market (where there is in general a wider margin of uncertainty), and as a result it was estimated that total demand, inland and export, would fall in the range of 200,000,000 to 215,000,000 tons in 1965. There are many features of the present-day market situation whose impact in the future is difficult to assess, and, inevitably, this estimate is subject to a considerable margin or error. It does, nevertheless, represent a realistic appraisal of the prospects recognizing the strength of competition. Demand in the individual sectors of the market is considered in the following paragraphs.

Electricity

The demand for electricity has been growing more or less steadily for many years, and the amount of electricity sold and supplied more than doubled in the past 10 years. Indeed, it is a convenient rule-of-thumb assumption for industrial countries that the demand for electricity tends to double every decade. Increasing mechanization in industry, the greater use of mechanical appliances in the home, and the growing popularity of refined fuels make it likely that the requirements of electricity will continue to grow.

The Central Electricity Generating Board's programmes for new generating plant are settled five years in advance. It has estimated that maximum demand in 1964 would approach 30,000 megawatts (which compares with a maximum demand of 20,900 MW in 1959) and is planning for a total capacity of some 33,600 MW at the end of 1964. In addition, it is expected that there will be a substantial commissioning programme for 1965[7].

Some of the new capacity will be provided by nuclear power stations, the economics of which, however, are necessarily somewhat uncertain. The recent report prepared by the Energy Advisory Commission of the Organization for European Economic Co-operation under the chairmanship of Prof. Austin Robinson examined the relative economics of electricity at nuclear and coal-fired plants, assuming a 75 per cent. load factor in each case. The report suggests that: "At the state of development likely to be reached during the next few years, electricity generated in nuclear plants seems unlikely to be competitive on a strictly economic basis unless it may be simultaneously assumed that the appropriate rate of interest is 5 per cent. or less, that the nuclear plant is constructed in a country in which construction costs for this very elaborate plant are relatively low, and that the alternative costs of traditional fuels are relatively higher than they normally are in the neighbourhood of coal mines."[11]

The nuclear energy programme in this country has been twice deferred to some extent, and it now appears that seven nuclear power stations, Chapelcross and Hunterston in Scotland, together with Berkeley, Bradwell, Hinckley Point, Trawsfynydd, and Dungeness, with an ultimate combined output capacity of some 2,200 MW, will be in operation by the end of 1964.[7, 12] The Central Electricity Generating Board estimates that in the year ended March, 1965, some 10 per cent. of its total electricity output will be from nuclear generating plant[7].

Some part of the demand will also be met by electricity generated from oil. The original plans initiated in 1954/55 provided for oil to be burnt at 17 power stations. These plans were modified in 1957, when the number was reduced to 14, and again in 1958/59, when the conversion of two stations was deferred for a year. Last year approximately 4,000,000 tons of oil were burnt at power stations, but the quantity is expected to have fallen to 3,000,000 tons by 1965[13].

It is evident that by far the largest part of the greatly increased amount of electricity required in 1965 will be generated from coal. After consultation with the Central Electricity Generating Board, the South of Scotland Electricity Board, and the North of Scotland Hydro-Electricity Board, the "Revised Plan for Coal" puts their combined requirements at 55,000,000 tons (it could be more), a substantial increase on consumption in 1959, which was 46,000,000 tons.

Gas

Sales of gas have also increased in recent years, though very much less rapidly than sales of electricity. Total gas sold and used in the year 1958/59 amounted to 2,605,000,000 therms, which compares with 2,460,000,000 therms in 1950/51. Domestic sales have fallen, whereas industrial and commercial sales have risen quite substantially, although between them these two markets still account for less than half of the total gas sold[8]. Coke sales, on the other hand, have fallen away since 1955/56 and substantial stocks of coke have accumulated.

After remaining more or less steady for several years, the coal consumption of the gas industry fell markedly in 1957, 1958, and 1959 following the fall in demand for coke. The reduced make of coal gas was balanced by the greater amounts of gas obtained from other sources.

There has also been a trend away from the use of the traditional carbonization coals towards high-quality coals of lower rank, due to the fact that graded qualities of this type are required for the manufacture of premium cokes, for which there is a good demand. The construction of two, possibly three, Lurgi plants to use low-rank small coals means that this trend may also be expected to continue in the future.

The "Revised Plan for Coal" gives a figure of 21,500,000 tons as the estimate of the gas industry's demand in 1965; this is the mid-point of a range given by the Gas Council and is 1,000,000 tons less than actual consumption in 1959. The estimate is reasonably well supported by the

development plan for the gas industry published in February of this year.

The Gas Council estimates[14] that sales of gas will amount to 2,839,000,000 therms in 1965/66, a 9 per cent. increase on 1958/59. As might be expected, the largest rate of increase is expected to take place in the industrial market, but domestic consumption is also expected to expand. The additional gas required to meet the increased demand will be provided by greater purchases, which are expected to increase by nearly 50 per cent. between 1958/59 and 1965/66. Some of this may come from coke ovens, but it appears that there will be much increased purchases of refinery tail-gases, and there are also possible imports of methane. A substantial increase in the capacity of plants gasifying oil is planned—by March, 1966, it is expected to be about two and a half times the 1959 level—and there will be a corresponding rise in the amount of oil gas made. The total gas made will remain constant over the period, and thus the amount of coal gas made is expected to fall from 65 per cent. of the total gas available in 1958/59 to 55 per cent. in 1965/66.

Coke Ovens

Expected improvements in living standards in this country can only be achieved by increased industrial activity, and increased industrial activity is synonymous with increased steel production. The precise rate of future growth in the demand for steel is difficult to determine, but this year production may be up to 20 per cent. higher than that of last year and is forecast to reach 24,000,000 ingot tons of steel. By 1965, with continued expansion and modernization in the industry, capacity may well be up to, or over 30,000,000 tons. The effect of this expansion in the steel industry will be reflected in the activity of blast furnaces, and although some continued improvement in coke rates per ton of pig-iron produced may be expected, increased tonnages of metallurgical coke will be required to be produced at coke ovens.

The major part of the requirements of metallurgical coke are met from ovens owned by the iron and steel industry, but NCB ovens and those owned by independent companies may not be unaffected by the general expansion.

In total, coal requirements for all coke ovens are forecast to increase to 35,000,000 tons by 1965; this is some 8,000,000 tons more than was supplied last year, but in 1959 coke ovens were badly affected by recession and until the latter months were working at well below capacity. The estimate for 1965 has been arrived at after close consultation with the iron and steel industry and takes account of increased requirements associated with the new strip mills in South Wales and in Scotland as well as expansion schemes either in hand or planned for the next few years in Durham, Lincolnshire, and the Midlands.

All coalfields producing carbonization coals will be contributing to the additional requirements by 1965, but the main increases will be met from Durham, South Wales, Scotland, and Yorkshire.

Railways

There has been a significant fall in railway consumption of coal during the past few years. To some extent it reflects falling freight traffic, but it is also the result of the modernization of the railway system, the original plan for which was approved in 1955. At the end of 1959, more than 1,700 diesel locomotives were in service, together with some 3,200 units of diesel multiple-stock.

A reappraisal of the modernization plan was undertaken in 1959[15] as a result of which the pace of the programme was accelerated. It was originally envisaged that 15 years would be required for the substantial completion of the plan; it is now intended to complete many of the projects by the end of 1963. In particular, the run-down in the railways' use of coal will now be much more rapid; whereas the original plan saw some 7,000 steam locomotives in service in 1970, the present estimate is that the 16,000 steam locomotives in service at the end of 1958 will have been reduced to 7,000 by the end of 1963. As the reappraisal of the plan states: "By the end of 1963, steam traction will have been eliminated from large areas of the country and replaced by electric or diesel traction."

So far, the most obvious result of the modernization programme has been the replacement of steam locomotives by diesels and diesel multiple units, and it is clear that this process will continue rapidly in the next few years. In many cases, however, and particularly where traffic density is high, electrification has advantages over both steam and diesel traction. By 1963 the electrified route mileage is expected to be some 1,600, which compares with 1,000 route miles of electrified track in service at the beginning of 1959, and it seems clear that there will be substantial extensions in the years following. The electrification of the railways is a desirable development from the point of view of the coal industry, insofar as a large part of the railway's energy requirements will fall, indirectly, on coal.

After consultation with the British Transport Commission, and in the light of the reappraisal of plans, an estimate of 6,000,000 tons was included in the "Revised Plan for Coal" as the railways' demand for coal in 1965; it compares with an actual consumption, excluding briquettes, of 9,500,000 tons in 1959.

Domestic

Assessment of the prospects in the domestic market presents a number of problems. In the markets previously discussed future demand for coal depends upon the execution of plans which involve the expenditure of considerable capital sums and to which a fair measure of certainty attaches. In the domestic market, where there are more than 16,000,000 separate domestic premises, the great majority using coal, demand is the outcome of numerous individual decisions.

Although the use of both electricity and oil (mainly paraffin) for heating in the home has increased in recent years, coal has stood up very well to the competition of other fuels. There was a

distinct fall in domestic consumption in 1959; at 29,000,000 tons (including naturally smokeless coals) it was some 3,000,000 tons less than a year earlier, but this is very largely the result of the exceptionally warm weather. Making allowance for the effect of the weather, domestic coal consumption has remained remarkably steady for a number of years, although it must be remembered that the market was decontrolled less than two years ago. Experience since decontrol suggests that there was virtually no suppressed demand at the end of the period of control. The most obvious effects of decontrol are the increasing selectivity of the householder seeking a reasonable quality at a reasonable price, and the distinct tendency for demand to be increasingly concentrated into cold periods. Not only so: one short cold spell, even a day, can produce a sharp increase in the number of orders.

The biggest source of uncertainty about the future of the domestic market is the Clean Air Act. So far, the demand for coal has not been greatly affected; progress with the creation of smoke-control areas, except in certain cases, has not been rapid. The Beaver Committee[16] estimated that the full clean air programme might take 15 years; if this is to be fulfilled there will have to be a more rapid creation of smoke-control areas in the future. Although the Minister of Housing and Local Government has circulated local authorities asking for a programme for the establishment of smoke-control areas, the creation of the areas depends upon the local authorities themselves. It is thus exceedingly difficult to form an estimate of the effect of clean air on the domestic market in the next five years or so. Ultimately, some 19,000,000 tons of coal (including miners' coal) may be displaced, but it seems clear that only limited progress will be made between now and 1965.

Bearing in mind that progress under the Clean Air Act is bound to mean the loss of part of the market for bituminous coal, the estimate for domestic consumption in 1965 was placed at 27,000,000 tons. Included in that figure are increased tonnages of the naturally smokeless fuels largely used in boilers, heat storage cookers, and closed stoves. There is a very strong market for the anthracite and dry steam coals, and more will be produced.

All Other Inland Sales

Included under this heading are general industry, the heating of large buildings, and coal for the manufacture of solid fuels (excluding coke and semi-coke). Assessment of the prospects in this sector of the market is again difficult because of the large number of consumers involved.

It may be expected that the total fuel requirements of this group of markets will increase as industrial production expands; in particular, the energy requirements of industry will grow. The part that coal will play in meeting these overall requirements is much less certain; quite clearly it depends upon our success in meeting competition. Oil competition in this sector has been formidable, and there is every indication that it will continue to be so. Between 1955 and 1959, deliveries of oil to general industry increased by the equivalent of some 5,500,000 tons of coal; in central heating (excluding private houses) there was an expansion of over 2,000,000 tons of coal equivalent. In addition, the use of the refined fuels, electricity and gas, may be expected to continue to grow.

The Clean Air Act has also affected these markets and it seems likely that there will be increasing pressure for the replacement of old plant, largely coal-burning. Modern and efficient coal-burning plant which will comply with the Act is available, and every effort must and will be made to see it is chosen. But there will be cases where it is not.

For many purposes, particularly steam-raising, and in areas on or near the coalfields, coal is better value than oil. The efforts to improve the quality and consistency of our products and the service offered to the consumer will yield results. A realistic appraisal, however, suggests that coal consumption in this sector, particularly in areas distant from coalfields, will fall, and the estimate for 1965 is 40,000,000 to 45,000,000 tons, which compares with the 46,000,000 tons consumed in 1959.

Exports and Bunkers

Before the war, a very considerable proportion of the coal produced in Britain was sold abroad. After the war, the strength of home demand did not permit a resumption of exports on anything like the same scale, although an average of about 15,000,000 tons a year was exported in the eight-year period up to 1956. In 1956 we gave notice that we should have to curtail our exports severely. In addition, European countries have been importing coal in quantity from the USA under contracts made in years when there was a shortage. Helped by the low level of transatlantic freight rates, American coal is highly competitive in Europe, and although there have been moves at Government level to restrict the flow, there is economic pressure for it to continue. Polish coal is being sold in substantial tonnages in Europe at prices lower than for many years, and some also from the USSR. Demand has also fallen as a result of oil competition. The home coal industries of Europe have found the competition of low-cost foreign coal formidable and some countries have imposed restrictions upon imports.

In these circumstances, this country has an uphill task in rebuilding the export trade. In 1959, coal exports (including bunkers) amounted to about 4,500,000 tons. The board is making very determined efforts to increase this quantity in the coming years. With competitive prices and the assurance of continuity of supply, it is aimed to reach a trade of some 10,000,000 tons by 1965.

IMPLICATIONS OF THE PLAN

The best estimate that can at present be made of total demand in 1965 is thus that it will fall in the range of 200,000,000 to 215,000,000 tons a year. It must be recognized, as is pointed out in

"Revised Plan for Coal," that "the margin of error in any such estimate is considerable."

The Government's fuel policy is to allow the consumer to make the choice between one fuel and another. Thus, in April, 1957, the then Paymaster-General, Mr. Reginald Maudling, said: "As far as possible we should allow the balancing of demand and supply of energy to be determined by normal commercial considerations."[17] This was confirmed more recently, when the Minister of Power said: "I am supported in my choice of what I call a competitive fuel policy by the recommendations of the Ridley report," and he quoted the following passage from that report[18]:—"In our view the right policy, and indeed the only practicable one, is to leave the pattern of fuel use to be determined by the consumers' own choice between competing services." This being so, the revised estimate of demand can only be an assessment of the success that coal will have in meeting competition.

Thus, it is the industry's own efforts which to a large extent will determine the size of the market, and whether or not the plan can be realized will be shown in the next few years by the success or failure of those efforts.

Some of the factors taken into account when the plan was drawn up have their own implications. It is foreseeable, for instance, that the changing pattern of the gas industry towards the use of low-rank coals and oil may create difficulties in the marketing of the normal carbonization coals. The growth of the demand from the electricity industry for coal for pulverized fuel firing will greatly increase the demand for untreated smalls and lead to a reduction in the requirements of treated smalls.

But the most important implication of the plan is clear. The plan is not pessimistic; it envisages a sizable increase in demand and production from the level to be attained this year. It assumes a substantial measure of competitive success for coal. The industry must take steps to ensure that its products and service are good, and its prices competitive, so that coal will be the consumer's first choice. Otherwise the plan will not be realized.

Quality and Consistency

There can be no doubt that in the past coal has lost goodwill and markets as a result of consumers receiving supplies which were below standard. To some extent this was inevitable in a time of shortage, when quantity had to be put before other considerations, and when it was difficult to ensure continuity of supplies from one particular source to a particular customer. But when coal's major competitor is a fuel which, above all, is consistent in quality, coal, if it is to compete effectively, must be equally so.

A strenuous effort is required to improve the preparation of some of the qualities supplied to the domestic market. To try to satisfy every consumer is a formidable task, but it is a task which every go-ahead concern must set itself, and it is of first importance that if the market is not to be thrown away, no consumer should receive a delivery containing free dirt, the cause of many of the complaints against coal. In addition, both the board and the retailer have a responsibility to see that degradation is kept to a minimum.

Consistency of quality, more particularly as regards ash, moisture, and fines content, is also of first importance in the industrial steam-raising market, particularly so far as smalls are concerned, since this market is very vulnerable to competition from oil. Inconsistency is inimical to automatic combustion control, a "must" in modern industry. The various appliances in use vary in the way they react to inconsistency. Chain grate stokers, for example (and they are probably the largest users of coal among mechanical stokers), can be seriously affected by variations in ash content. If the stoker suddenly receives coal exceptionally low in ash overheating and damage to the bars may result; with high-ash coal efficiency will fall, the plant will give trouble in holding its load, and, because of harder driving, grit emission could rise. Variations in moisture and fines content can cause handling difficulties in many types of plant, and the consequences may be serious.

Preparation Facilities

Although much has been done to achieve more consistent products, there are still in particular too many washed smalls which vary in quality more than is desirable.

It is thus clear that many improvements in the quality and consistency of the board's products are needed. In some cases, the provision of new preparation facilities is required, although, as more and more new preparation plants are provided, the possibilities of obtaining further improvement in this way become more limited. It must not be forgotten that a very large number of new plants have by now been installed by the board. In almost every case improved attention to the day-to-day running of preparation facilities can produce worthwhile results. It is not an exaggeration to say that today, the preparation plant is as important as any part of the colliery.

Improvements can be and are being sought in many directions. Considerable attention has been paid recently to the extraction of fines from smalls for industrial use. A national total of about 3,000,000 tons per annum of "fines free" washed smalls is produced by the exclusion of froth floated fines, mainly in the North-Eastern and South-Western divisions. About another 1,500,000 tons a year are produced by the exclusion of flocculated fines as practised in several divisions. In addition, some 4,000,000 tons are produced, mainly in the North-Eastern and East Midlands divisions, by the extraction of dry fines from the coal before it is washed. On this basis a considerable part of the treated smalls going to industry is being supplied in an improved form.

Much can be done by measures of the kind discussed above, but it has become clear that one of the greatest barriers to improving the quality and

consistency of the industry's products is the variation in the raw coal produced hour to hour at the pit.

Research may make it possible to mitigate the effects of inconsistency in the feed to washery plant. Work is currently being undertaken on the problem of rapidly measuring the ash content of the coal as it flows into the plant, with the ultimate objective of providing advance warning of changes to the operating staff and so permitting adjustments in the operation of the plant. It is too early to say how far this work will prove successful, and if it were how long it would be before it could be generally applied. But in any case inconsistency in the run-of-mine coal increases the risk of inconsistency in the washed product, and that in turn leads to dissatisfied customers and ultimately loss of trade.

Inconsistency in the dirt content of the raw coal is one problem; excessive, even if consistent, amounts of dirt brought out of the pit can produce just the same result—inferior and inconsistent washed coals. Overloading of washery plant, and in particular the presence of more dirt than it can handle, reduces its efficiency and the quality of the product.

Furthermore, it is clearly uneconomic to bring dirt out of the pit. This point was made at last year's conference of the NACM by Mr. N. R. Smith[19] and it should be stressed. The reason lies in the price structure for industrial coals, whereby a coal is in effect penalized twice for its ash content, the secondary ash adjustment having a very substantial effect on price in the higher ranges of ash content. While it is recognized that increased dirt in coal means reduced prices, it could be thought that the increased tonnage sold more than compensated for this. It does not; there is always a reduction in total proceeds. Take, for example, the case of a ½ in.-0 untreated small coal produced in the North-Western Division with a 24 per cent. ash content and a calorific value of 10,500 B.Th.U. per lb. The price structure gives a price of 54s. 10d. per ton; thus, 100 tons would produce 5,483 shillings in proceeds. If this coal could be produced at the same moisture content and an ash content of 18 per cent., it would have a calorific value of 11,390 B.Th.U. per lb., giving a price of 65s. 1d. per ton. On the assumption that the material left underground in order to produce the better quality contains 75 per cent. ash, the vend of the improved coal would be reduced to 89.5 tons. Total proceeds would now be 5,824 shillings—a gain of just over £17. It must always pay to produce the untreated smalls as clean as practicable by exercizing greater supervision. It never "pays" to produce treated smalls for which there is no market.

There is a further point, beyond the purely financial one. It seems very likely that increasingly in the future smalls will be wanted untreated. But coals with very high and variable ash contents are not going to be acceptable, even to very large consumers, so that in the case of some collieries the ash content of the coal as it leaves the pit will prove critical.

Service to Consumers

The marketing methods used when controls were in force and distribution was against allocation were economical, and this may have encouraged the view that marketing could be carried out on a minimum budget. Service to consumers was subordinated to the need to make supplies of coal available, not always in the size or quality preferred. Fuel efficiency checks were made by the Ministry in order that the minimum quality consistent with needs was supplied. For those with experience of selling and the servicing of sales, the period of wholesale allocation of supplies, desirable under emergency conditions, was not without its difficulties.

Under present conditions, in a buyers' market, it must be understood that the industry has to provide not only the amounts and qualities to meet consumers' requirements, but also the service, either directly or through the distributive trade, that consumers require. Already much has been done. The introduction of regional selling has simplified the task of buying coal for the consumer, and the board has contributed liberally to the funds of the Coal Utilization Council.

In the years immediately following nationalization, the industry's continual problem was to "chase the last ton," and so the great bulk of its investment went towards enlarging and improving production capacity. The concentration on production limited "service to the customer" and a full-scale development of the technical and sales force and stimulation of demand would only have made the task of getting all the coal required more difficult.

Service takes a different form as between one consumer and another. With the nationalized industries it is largely a matter of day-to-day business attendant on normal distribution, the close liaison on short- and longer-term requirements and how they are to be met. Technical service is largely carried out inside these industries by their own staff, and great strides have been made in improving efficiency.

In many other industries, and certainly so far as the quasi-industrial consumer and the householder are concerned, the situation is different. Although many industrial consumers make very efficient use of their fuel, there are others who can benefit from information and advice on the latest developments in boilerhouse practice. The householder, though continuously using solid fuel—and some 90 per cent. of householders in Britain use solid fuel to heat their living rooms in winter[20]—is only occasionally concerned with the technical details of his appliance. In these markets the availability of a good and consistent product is not enough; the consumer has to be informed and persuaded of the merits of the fuel and the quality of the appliances.

For the board these markets are perhaps the most critical. In terms of tonnage the industrial market is now consuming 31,000,000 tons and the domestic market some 29,000,000 tons. In terms of influencing public opinion these markets are

crucial, as the industrial market involves some tens of thousands of consumers and the domestic market impinges on the life of most of the 16,000,000 households in the country. It is in these markets that the public image of coal is largely formed. It is the complexity and amorphous nature of these markets which make it especially difficult to persuade consumers to use the right solid fuel and most suitable appliance. It is both a problem of selling and a problem of public relations.

Before decontrol the board devoted some of its resources to the "nursing" of the domestic and industrial markets. A number of domestic and industrial representatives—some commercial, some technically qualified—were appointed to each of the coal consuming regions. In 1950 the activities of the Coal Utilization Council were considerably expanded. Its tasks were defined[21] as:—

"(*i*) stimulating the coal and appliance trades to give a first-class standard of service to the public;

"(*ii*) providing training facilities for the staffs of the coal and appliance industries to enable them to sell and service their goods to the best advantage;

"(*iii*) publicizing the use of solid fuel in modern appliances as the cheapest and most efficient means of domestic heating, cooking, and water supply."

The board has provided a substantial part of the council's income, and in 1959 contributed over £200,000.

In December, 1953, on the recommendation of the Pilkington Committee, the National Industrial Fuel Efficiency Service (NIFES) was established.

Among other things this service was expected:—

"(*a*) to provide and promote the provision of general advice to industry on efficiency and economy in the use of all forms of fuel, heat, and power;

"(*b*) to give practical help in securing the efficient and economical use of fuel and power to individual fuel users and to such commercial and other fuel users (including Government departments and public bodies) as are not catered for by the Coal Utilization Council's activities in the domestic field."[22]

Up to the year ended March 31, 1959, the board had given almost £1,000,000 of the total contributions to the service of nearly £2,000,000. These several activities improved the services available to the consumer. Knowledge of new appliances and methods of improving efficiencies on existing plants were more widely disseminated. But both with the CUC and NIFES, the initiative in the last analysis is left with the consumer. On account of their size and the constitution of these bodies, the approach for specialized and particular advice on coal must come from the individual consumer.

While in the last 10 years the board was rightly concentrating on producing more coal, its competitors in the industrial and domestic fields were investing heavily in consumer services. The gas and electricity showrooms in every town, the high-pressure salesmanship by the oil companies both nationally and locally, are but obvious examples of this mounting competition. If a consumer—industrial or domestic—considered changing or improving his fuel appliance, these competitors would be assiduously pressing the claims of their fuels, and all the consumers had to do was to distinguish between their rival claims. The case for coal was neither continuously nor conspicuously argued.

The fall in demand in the last three years, together with the external pressure from competitors, has given the board's marketing organization an opportunity and a challenge. Where previously coal was allocated, now it must be sold. Now that the struggle for bulk tonnage is past, the needs of the individual consumer must be more closely studied. The flexibility inherent in the "Revised Plan for Coal," together with the reduced pressure of demand, can give the board's marketing organization the "elbow room" to supply coals bearing lower transport costs; can ensure that supplies will flow more regularly from the same sources. Moreover, this flexibility, together with the great improvements in coal preparation—the board is now spending £25,000,000 to £30,000,000 a year on cleaning and preparing coal—has given the board the opportunity to press the virtues of coal on the consumer. Scarcity and control of supplies are gone and lack of preparation should no longer prevent the board from competing freely in the domestic and industrial markets. The board has, therefore, sought to strengthen its competitive position in the industrial market by expanding its technical and sales force and in the domestic market by increasing its contribution to the CUC and by introducing a loan scheme.

The board hopes to achieve, and is indeed achieving, its greatest impact on the industrial market with its technical and sales force, which was considerably enlarged at the end of 1959. Present and potential consumers, appliance manufacturers, architects, heating engineers, and all those who use or can determine the choice and use of fuel are being approached. The sales force consists of commercial and technical representatives. The commercial representatives call on all major consumers—accompanied, where appropriate, by the distributor's representative. In addition, they will establish and maintain the essential contacts with the local authorities, the builders, the consultants, and all those who influence local opinion on fuels in the representatives' areas. The technical representatives will support the commercial representatives on specific cases which call for technical knowledge and skill of a high order.

In the domestic market, the number of consumers makes it impossible to attempt or rely on the personal approach. The board must depend to a large extent on the quality of the service provided by the merchants. The objective of the board must be to improve—in many cases considerably—by advice and example, the services offered to the public. At the pit it is imperative that the bad wagon should not be despatched—one bad wagon can well produce 50 or more dissatisfied customers.

In the colliery areas the board's retail sales service can set the example; elsewhere the board can only indirectly influence the standard of service. The CUC schemes for improving the service given by appliance distributors and fixers and by coal merchants and the CUC's technical advisory service to the trade and consumers are steadily improving standards of service in the domestic market. The board's recent "House warming plan" to provide modern domestic solid-fuel-fired appliances and central-heating installations on credit terms invokes the use of one of the most potent instruments in modern consumer salesmanship. The loans cover the cost of any installation over £20 and repayments can be made over periods up to five years except in the case of appliances costing less than £50, when the maximum repayment period will be two years. Interest is at the rate of 5 per cent. and will continue at the same rate for the whole period of the loan. Such terms when combined with the capital and running economy of modern solid-fuel-fired installations should apeal to all who are interested in improving their own personal standards of comfort.

Efficiency is a relative term, but the task of the board's selling organization is to help the consumer achieve the greatest possible fuel efficiency with his existing plant and, when he changes, to guide him to the most efficient modern solid-fuel appliance. Increased fuel efficiency, although reducing the demand for coal, is very much in the long-term interests of the industry. Every new solid-fuel appliance installed will provide a potential market for 20 years; every old installation that works inefficiently contains the possibility of a conversion to oil. An indication of the size of the problem in the industrial market is given by the estimate that some 46 per cent. of Lancashire boilers were installed 40 years or more ago[23], and that in 1958 there were not less than 18,000 Lancashire boilers consuming 20,000,000 tons a year in regular use in the country[24].

Publicity

However much may be achieved by improved quality and consistency and by better service, publicity will be required to back up these efforts. The general tenor of public opinion about coal will influence individual decisions as to whether coal should be used or not. Clearly, the job of the salesman will be infinitely easier when the public believes that there is a case for coal, and is prepared to let him state it. There has been a danger that consumers would reject coal out of hand, without any consideration of its merits for their purpose, as a result of a feeling that it was old-fashioned and out-moded.

There can be no doubt that in recent years opinion has tended to move against coal. There are many reasons, among them dissatisfaction with quality, the frustrations of shortage in the past and inability to obtain the coals the consumer preferred; but in part it has been due to the cumulative effects of the welter of uninformed, sometimes malicious, criticism the industry receives and to the advertising of rival fuels which suggested that coal was out of date.

The most important function of the board's publicity must be to create a more favourable climate of opinion, the advertising of particular products being at this stage a subsidiary objective. In short, the aim must be to make as many consumers as possible "coal-minded." With this in view, very substantial advertising has been directed towards the domestic market by the CUC, which both the board and the distributive trade support. There have been campaigns both last year and this; television has been used as well as national and local press. The teddybear was adopted as the symbol of coal and much of the advertising has sought to remind people of the advantages in cosiness and comfort of a coal fire. Other publicity, in the form of pamphlets, booklets, etc., has emphasized the economy of solid fuels in general when burnt in modern appliances.

The most important "opinion-influencing" advertising being undertaken is the current programme in the national Press which features firms which are using and are well satisfied by coal. The industrial concerns participating in the campaign have national reputations for efficiency, emphasizing the point that coal is a good choice for the industrialist. This advertising is not confined to national newspapers; it is also going into national journals and magazines and some of the provincial daily newspapers. An extension of the campaign featuring selected firms with more localized reputations is planned, together with a similar kind of programme in trade magazines and the like.

Additionally, a great deal of publicity of a more specialized character has been undertaken. Well-established smokeless fuels have received special attention. "Phurnacite" has been widely advertised and a campaign in support of hard coke has been run in conjunction with BCIA. A large number of pamphlets and booklets have been produced by the CUC dealing with home heating and domestic central heating in particular. Stands are being taken at some of the principal national exhibitions, and the sales regions will go into certain local exhibitions. Booklets, stating the case for coal, have been prepared for circulation to potential users, architects, heating engineers, members of local authorities, and in general all those who might have a say on choice of fuel. There is the local publicity carried out by sales regions which may include Press advertising and the production of leaflets.

The advertising of the board's new house-warming plan has been a major addition to this specialized publicity. Fundamentally aimed at householders considering the installation of central heating, a market in which oil is making a big sales drive, it also covers the domestic market in general. By making use of a coupon to be returned by the householder, the national Press advertising seeks to evoke a direct response from the reader so that he will want to make use of the plan. Local advertising lists the firms of appliance distributors and

heating engineers associated with the scheme. The advertising has thus a very specific end in view, but it does in effect publicise and is planned increasingly to publicise the domestic use of solid fuel as well.

This leads to an important point. Although it is difficult to gauge the effect of much of the advertising for coal, the very fact that the coal industry is advertising is going part of the way to showing the public that there is a new outlook. The industrial advertising in the national Press will also have its effect on the domestic consumer, while the publicity for the credit plan will help to build up the idea of a modern coal industry in the mind of the industrialist.

It will be necessary to continue advertising; indeed, it will now be a permanent feature of the marketing of coal. But it must be remembered that while technical service and advertising have their parts to play—and very important parts they are too—the first essential of service to the consumer is coal of good and consistent quality.

Prices

The problem of the price of coal in relation to competitive fuels has recently been placed in its starkest perspective by the report of the Energy Advisory Commission to the OEEC. The report stated: "Studies of the long-term relations of coal prices to other prices show that over the period since 1913, the relative price of coal, as compared with all other wholesale prices, has risen in all industrial countries . . . Compared with all other prices, coal had by 1953 become some 50 per cent. more expensive than it had been in 1913 both in Europe and in America. But, while the relative prices of coal have continued to rise in Europe, the American relative price has been constant or declining since 1946. . . . There has been an apparent long-term tendency for European coal to be less competitive with other fuels. . . .

"The future competitive position of the European coal industry will largely depend on whether this long-term upward drift of the relative cost of production in European coal can be arrested. . . . The stabilization of the relative prices of European coal is ultimately conditional on a more rapid rise in productivity. We believe that the health of the European coal industries will in the long run be best secured by a concentration of production where the prospects of increasing productivity are greatest."[11]

So far as the British coal industry is concerned, the recent indications are that our competitive strength is being improved. The capital investments of the national plan and the build-up of technical staffs have brought technological progress at a much swifter rate than in previous decades. Indeed, in 1959 the industry made more rapid advances in operational efficiency than in any other year since nationalization. Productivity was at record levels and the improvement of 6 per cent. in faceworkers' output a manshift during the year and of 5.3 per cent. overall were the biggest increases recorded for more than 30 years. This improvement in productivity was largely responsible for a fall in production costs of about 1s. 9d. a ton compared with 1958. Moreover, since June, 1957, the general level of coal prices has been held stable.

So far as our competitors in oil are concerned, the effect of the low prices in fuel oil are beginning to work through the system. As long ago as December, 1958, a director of one of the largest oil companies operating in England was commenting: "If the refineries' main programme of supplying a growing demand for fuel oil for industry is to be realized, it is inevitable under existing refinery techniques that a large quantity of light fractions and especially of motor spirit should be manufactured concurrently. Various factors, including high taxation, inadequate roads (particularly in the United Kingdom), and the trend of commercial vehicles towards Derv fuel, make it difficult in western Europe to sell the quantity of motor spirit which is manufactured in consequence of the large fuel-oil production; and this creates some degree of imbalance in the West European market compared with other parts of the world."[25]

Again, the Economist, reviewing a study by the First National City Bank of New York, reported "that since the effects of the Suez affair subsided, at any rate, the level of oil prices actually realized on products refined from Middle East oil has been so low as to wipe out any profits on the operations of transporting, refining, and distributing the oil. The majors have been making a loss on bringing their oil to market . . ."[26]

Eighty per cent. of all our crude oil imports in 1959 came from the Middle East. It is, therefore, not without significance that the price of fuel oil has increased by ¼d. a gallon (the equivalent of 15s. a ton) since the beginning of 1959.

The present level of depressed crude and product prices would not seem likely to last for a long period. The need for the restoration of a profit margin at all stages of production and distribution would seem desirable—if not essential—to enable the oil companies to finance their plans for capital development. Pressure from the governments in the oil-producing countries to change the 50:50 profit-sharing formula may also push up prices. Apart from the general tendency of prices to rise it would seem likely that the change in fuel oil prices will be greater. Outside North America, fuel oil has changed from being an unwanted residual product to the largest single component of refinery output. In the case of the UK refineries it has been estimated to account for an average of 40 per cent. of all products. In the past, the main financial burden of transporting and refining crude oil was borne by products not competing with coal; in the future this burden will have to be increasingly carried by the competing products themselves. The end of the period of the oil companies buying their way into coal markets may be in sight.

The future prospects of the coal industry relative to other fuels have been said to "depend almost wholly on whether coal can hold its own in increasingly keen competition of price and convenience. . . . There is little question that in many

areas coal still holds a strong competitive position. On the other hand, that competitive position can easily be weakened by further increases in the relative price of coal. . . ."[27] The revised plan for coal and the new sales campaign will not ensure that the mining industry holds its place in the fuel markets. The nub of the problem is price. The board's efforts will be nugatory unless costs are held and, if possible, reduced—and this can only come from increasing productivity. In the last analysis the success of the coal salesman depends on the efficiency of colliery management.

THE CLEAN AIR ACT

It is impossible to discuss the changes in the markets for coal which are implied in the revision of the national plan, or for that matter in any assessment of coal's prospects, without considering the effects of the Clean Air Act. This Act is the most important single legislative provision affecting the selling of coal for many years; it has already had certain effects, particularly in the industrial market, and there will be more substantial changes in time.

The methods adopted in the Act to deal with industrial and domestic smoke differ, although some provisions are common to both. The emission of "dark smoke" (defined by reference to the standard Ringelmann chart) from all chimneys is in general prohibited, but this mainly affects the industrial use of fuel, as domestic chimneys seldom produce "dark smoke."

There are certain exceptions and defences to this provision covering temporary situations in which the emission of dark smoke is unavoidable. In addition, local authorities may issue certificates conferring exemption where it can be shown that it is not practicable to alter the building or its equipment: these certificates have, however, to be renewed annually and are in any case not available after July, 1963. All new furnaces (except domestic boilers) must as far as possible be capable of being operated without emitting smoke when burning the fuel for which they were designed.

The effect of these measures seems reasonably clear. They will force the renewal of old plant, the owners of which will have to choose whether to continue to use coal or not. In particular, they mean the virtual extinction of hand-fired boilers, and although the range of mechanically fired appliances permits the full range of industrial coals to be burned in compliance with the Act, it is only realistic to recognize that many industrialists, since the Act forces them to change their equipment, may decide to take the opportunity of converting to oil.

A further provision which affects the industrialist requires the installation of grit and dust arresting equipment on any new plant burning more than 1 ton of solid fuel per hour. The local authority has to approve the installation, but no standard of required performance is laid down. It is not so clear how far this requirement will affect the demand for coal, but it is reasonable to assume that in the present climate of opinion the industrialist will seek to keep grit emission to a minimum with the object of avoiding any possible trouble. Very efficient grit arresting equipment is expensive, and unlike the installation of modern coal-burning plant represents no saving in fuel costs, so it appears that there will be an increasing demand for coal to have a consistent minimum of fines content. This will strengthen the natural movement in demand which has been referred to earlier.

The most widely known feature of the Clean Air Act is the power it confers upon local authorities to create smoke-control areas in which all emission of smoke is prohibited, although it is a defence to prove that any smoke emitted was caused by the use of an "authorized" fuel (electricity, gas, anthracite, low-volatile steam coal, coke, low-temperature carbonized fuels, and carbonized briquetted fuels). Orders made under this provision can exempt certain types of appliance or fireplace.

It is this part of the Act that affects the domestic market. The double approach adopted in the Act, in fact, recognizes that, whereas it is possible to move towards clean air by laying a requirement upon industrial users to burn their fuels as smokelessly as possible, domestic air pollution can only be dealt with effectively by excluding stage by stage the use of bituminous coal altogether. For although a great deal of work has gone into the burning of bituminous coal smokelessly in the domestic grate, the problem is by no means fully solved. Nevertheless, the declaration of a smoke-control area will affect the industrialist as well as the householder.

Until recently coal laboured under a severe and unfair disadvantage under this section of the Act. Although oil is not an "authorized" fuel the Minister made an Order under the Act which has, since April, 1957, granted a general exemption from the smoke-control area provisions to "fireplaces specially designed or adapted for combustion of liquid fuel provided that they are so designed, maintained, and operated so as to minimize the emission of smoke." Only in July, 1959, was a similar Order made granting a general exemption to furnaces equipped with mechanized stokers on similar conditions and then providing that fuels for which the mechanical stoker was designed are used. Only furnaces installed since the beginning of 1957 are covered by this Order, but the Minister has also recommended local authorities to exempt furnaces installed prior to December 31, 1956, which are capable of being operated as smokelessly as those installed after that date.

As has been mentioned previously, progress towards the objective of extending smoke-control areas until the whole of the so-called "black" areas are covered has been somewhat slow, although there are perhaps signs that the movement is gathering impetus. At present, however, it seems as if the full weight of the Act will not be felt until after 1965. The rate of progress is an important factor to be taken into account in assessing demand in certain of the board's markets. Its

influence has already been discussed in this paper, but it must be borne in mind that if progress is accelerated then demand for raw coal for domestic use in particular will fall below the revised plan for coal estimate.

The figures of the revised plan include a certain tonnage of coal which it is expected will be processed into new solid smokeless fuels. Mr. F. Wilkinson, in his paper given to the 1959 conference of the NACM[28], referred to one of the new developments—the fluid-bed process. The pilot plant for this process is under construction at Birch Coppice, and it is hoped that before long supplies of the smokeless briquette made from fluid-bed char will be available for full-scale testing. In addition, a pilot plant is being built at Graigola which will produce mild-heat-treated briquettes from anthracite and low-volatile duffs. Both these plants will have throughputs of the order of 100 tons per day. It is hoped that, if there are no great difficulties, it will be possible to have full-scale plants in operation by 1965, producing up to 1,000,000 tons of smokeless fuels a year. This quantity would go a considerable way towards meeting the demand for solid fuel transferred from raw coal if the progress made in establishing smoke-control areas is as implied in the estimates of the revised plan for coal.

CONCLUSION

The implications of the revision of the board's plans for the future are substantial—not because any great contraction of the industry is foreshadowed, but because they reflect the very profound change in the industry's circumstances which seems certain to persist. As has been pointed out, the size of the future market for coal will be very largely determined by our own efforts and by the extent to which we can make our product competitive in terms of quality, service, and price. In the revised plan for coal, a substantial measure of success is implied; if it is not achieved the estimates of demand will not be fulfilled, which in turn will mean not the modest increase in the size of the industry that is at present envisaged, but a serious and possibly irreversible contraction.

This paper examines a number of factors which will shape the markets of the future, and considers the steps that must be taken by the industry. The consumer, for his part, will choose the fuel which will give him his unit of heat or pound of steam most conveniently and economically. It is up to us to see that he chooses coal.

REFERENCES

[1] "Plan for Coal"—National Coal Board, 1950.
[2] Report of the Committee on National Policy for the Use of Fuel and Power Resources, 1952. Cmd. 8647.
[3] "Investing in Coal"—National Coal Board, 1956.
[4] Hansard—House of Commons, May 10, 1956.
[5] Annual Statistics—Iron and Steel Board and the British Iron and Steel Federation.
[6] Annual Report—Iron and Steel Board, 1958.
[7] Central Electricity Generating Board—Report and Accounts, 1958/59.
[8] The Gas Council—Annual Report and Accounts, 1956/7 and 1958/9.
[9] Gas—Report of the Minister of Fuel and Power for the year ended March 31, 1955.
[10] Hansard—House of Commons, July 23, 1959.
[11] "Towards a New Energy Pattern in Europe"—OEEC, 1960.
[12] South of Scotland Electricity Board—Annual Report and Accounts, 1959.
[13] Hansard—House of Commons, February 1, 1960.
[14] "Gas Looks Ahead"—Gas Council, 1960.
[15] The British Transport Commission. Reappraisal of the Plan for the Modernization and Re-equipment of British Railways. Cmd. 613, 1959.
[16] Report of the Committee on Air Pollution, 1954. Cmd. 9322.
[17] Hansard—House of Commons, April 30, 1957.
[18] Hansard—House of Commons, November 23, 1959.
[19] Economic Methods of Coal Production—N. E. Smith, B.Sc., M.I.M.E., M.Inst.F., NACM Conference, 1959.
[20] "Market for Coal"—PEP, 1960.
[21] Coal Utilization Joint Council—Annual Report, 1960.
[22] NIFES First Progress Survey with Report and Accounts, 1955.
[23] NIFES Fifth Survey with Report and Accounts, 1959.
[24] NIFES Fourth Survey, 1958.
[25] "Large-scale Organization and Change: A Study in Oil-marketing." C. T. Brunner—Royal Society of Arts, December 10, 1958.
[26] "Profits from Oil"—Economist, April 25, 1959.
[27] London and Cambridge Bulletin No. 33. E. A. G. Robinson. Times Review of Industry—March 1960.
[28] "Future Markets for Coal." F. Wilkinson. NACM Conference, 1959.

Book Review

Handbook for Deputies and Shotfirers. By H. J. Wroe. Wigan: Thomas Wall & Sons, Limited, Rowbottom Square. 12s. 6d.

MANY of the candidates who present themselves for study for the deputy's and shotfirer's certificates are found to be men of good practical experience. Usually they have not attended a mining class and have some difficulty in answering oral questions. It is with the object of assisting these candidates to formulate answers to oral questions that the author, who has had experience in preparing candidates for the deputy's and shotfirer's certificates, has compiled this catechism.

The questions and answers are sectionalized into the statutory appointment and duties of a deputy; methods of working; haulage; nature of the atmosphere; mine gases and ventilation; support of roof and sides and the withdrawal of supports; safety in the use of machinery; precautions against inflammable dust; safety lamps, lighting and gas testing; fires and fire fighting; rescue work; first-aid; and explosives and shotfiring.

Many of the questions and answers are directly related to the Coal Mines Act, 1954, and Regulations and will help potential shotfirers and deputies to obtain a working knowledge of these rather complex statutory instruments as far as they would be applicable to them. Other sections cover the more technical aspects of mining and will help the reader to crystalize the knowledge gained in mining science and mining technology classes.

NACM: South Midland Branch

AT the annual general meeting of the South Midland Branch of the National Association of Colliery Managers, held at the Mines Rescue Station, Ashby-de-la-Zouch, on May 2, 1960, the following officers were elected to serve during the year 1960-61:—

President: Mr. T. W. Peters.

Vice-presidents: Mr. L. R. Watkin and Mr. L. J. Mills.

Branch Council: Messrs.:—J. R. Gibson, J. McPherson, H. B. Bennett, J. E. M. Chapman, W. Hall, S. A. McKee, D. Smith, W. C. Statham, W. Wallace, J. Godley, A. Summers, T. C. McCarthy, and H. C. Reid.

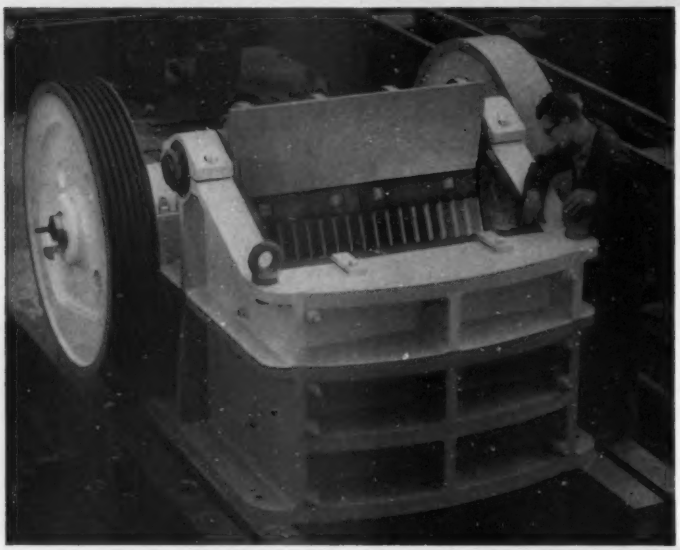
Secretary-Treasurer: Mr. L. R. Watkin.

Representative to national council: Mr. S. A. McKee, with Mr. T. W. Peters as substitute.

GEC Equipment For Indian Copper Mine

OUTPUT of the Indian Copper Corporation's Masaboni Mine in Bihar State has recently been increased to about 100 ton/hr., necessitating the replacement of the existing crushing equipment. The company has therefore installed a Blake crusher fitted with extra-wide jaws (50 in. by 16 in.), the plant being manufactured at the Fraser & Chalmers Engineering Works of the General Electric Company, Limited.

GEC makes two sizes of Blake crushers with extra-wide jaws—40 in. by 16 in. and 50 in. by 16 in. The particular value of these crushers is that they bridge the gap between the smaller range of jaw crushers and the larger true primary breaker. The two wide-jaw 16-in. crushers are specifically designed for reducing hard or tough ore which is not more than 12 in. in size to 3 to 4 in. ring at the rate of 50 to 100 ton/hr.



A 50-IN. BY 16-IN. BLAKE CRUSHER ASSEMBLED AT THE FRASER & CHALMERS ENGINEERING WORKS OF THE GEC BEFORE SHIPMENT TO INDIA.

This feed rate cannot be handled economically in any single primary machine in the normal range. One method of handling the tonnage would be to install two 30-in. by 16-in. crushers. But this would, of course, involve duplication of the feed and discharge arrangements, the motor, and the switchgear, and would be very costly. GEC crushers with extra-wide jaws satisfactorily cover the intermediate range of 50 to 100 ton/hr., being cheaper both in first cost and in running expenses than any other crusher or combination of crushers suitable for hard ore or rock. They have all the features of the company's improved design of Blake crushers, including all-welded construction throughout and roller bearings on the eccentric shaft for both the main frame and the pitman.

Swedish Steel Output Continues to Rise

SWEDEN's steel output during the first quarter of 1960 continued to rise at the same rapid rate as in 1959 and was 18 per cent. larger than in January-March last year, according to a survey in the Stockholm business weekly Affärsvärlden. Imports were up no less than 96 per cent., while exports rose by 26 per cent. This is likely to have resulted in a net supply of steel on the Swedish market exceeding that of any previous quarter.

In absolute figures, Sweden's production of ingot steel totalled 859,000 tons and that of merchant steel 559,000 tons. Imports amounted to 326,000 tons and exports to 118,000 tons.

The output during the first quarter denotes an increased share for high-quality products. Thus, the production of high-speed steel was twice as large as in the first quarter of 1959 and the output of stainless steel 56 per cent. larger, while the production of ordinary steel rose by only 15 per cent. Exports, though considerably larger than in the first quarter of last year, showed a seasonal decline compared with October-December, 1959, of 13 per cent. In terms of value, however, the drop was only ½ per cent.

Steel Industry Interested in New Air Circuit Breaker Unit

DISPLAYING its newest unit, the 3.3 kV., 150 mVA. (ASTA certified) type "AH," Whipp & Bourne, Limited, Castleton, Rochdale (Lancs), held a private exhibition at Newcastle-upon-Tyne recently. The purpose of the exhibition was to introduce this new H.V. air circuit breaker unit, rated at 1,200 amp., and to display to the guests and visitors, who came from various industries, its capabilities and suitability for the steel industry and other heavy industrial applications. Representatives of the steel industry have shown keen interest in the unit.

The "IF" 900-amp. air circuit breaker unit and the newer 2,000-amp. type "IFA" A.C.B. were also shown.

SIR CYRIL MUSGRAVE
(*Chairman*)

IRON & STEEL BOARD'S ANNUAL REPORT

Capital Expenditure Will Rise Further

SIR LINCOLN EVANS
(*Deputy Chairman*)

Capital expenditure in the iron and steel industry in 1959 is estimated at £99,000,000, as against £105,000,000 in 1958. A substantial increase is expected in 1960, states the Iron and Steel Board's annual report. The report, which was published on Thursday of last week, was briefly summarized in our last issue. A fuller summary is given below.

STEEL production in 1959 was 20,200,000 tons, about 5 per cent. higher than in 1958. From the second quarter onward output rose as general production increased, first in the consumer goods industries and later in constructional, mechanical, and electrical engineering. Exports also rose by about 10 per cent. Consumers' and merchants' stocks, which had been falling since June, 1958, continued to shrink until the fourth quarter, when they were stabilized. During the recession in 1958 and 1959 two thirds of the fall in steel demand was due to stock movements and only one third to a fall in actual consumption.

The Government's stimulus to investment in the public sector resulted in the latter part of 1959 in an increase in demand from the building and engineering trades and these industries were also affected by the rise in private investment. In contrast, the demand from the mines, railways, and shipyards remained depressed.

Motor Industry's Requirements

The experience of the various sectors of the industry during 1959 has been widely different. For example, to meet the sustained high demand from the motor industry, the continuous wide strip mills worked at full output throughout the year and production increased as new capacity was brought into use. Producers of ferro-concrete bars, however, started the year with low output, but after the rise in activity in the building and constructional engineering industries, production increased steadily in each quarter and at the end of the year was at record levels.

In contrast, the output of plate remained well below capacity until the fourth quarter, when export demand increased and production rose sharply. But even then it was some way below the post-war peak reached in the fourth quarter of 1957. The least active sector was that dependent on the railways; the output of rails and steel tyres, wheels, and axles remained low throughout the year. Supplies of sheet and billets gave rise to difficulties during 1959.

The motor industry's estimates of its sheet requirements in the years 1960-65 were raised twice during the year. Production from the continuous wide mills increased as extra capacity came in during the second half-year. Some teething troubles were encountered and this, coupled with difficulties in getting imports, aggravated the problems which afflicted some users. The shortage is expected to persist in 1960.

Re-rolling and Forging Billets

Early in 1959 demand for re-rolling and forging billets was well below capacity and the Iron and Steel Board raised with the British Iron and Steel Federation the question of producing some 250,000 tons of re-rolling billets of standard sizes for stock, thereby maintaining both activity in steelworks and expenditure on coal and transport. The federation preferred to wait for clearer signs of increasing demand before stocking billets and no action was taken. Surplus imported billets were, however, retained and released towards the end of 1959, when supplies again became tight. Production of forging billets was high at the end of 1959 because of the strong demand from the motor industry.

Production of alloy steels in 1959 was 17 per cent. higher than in 1958. The increased demand for stainless steel was particularly marked, especially for the motor and kitchen equipment industries.

Steel imports again declined last year. Sheet accounted for three quarters of the total. Exports revived markedly in the second half-year and in

the year as a whole were nearly 10 per cent. above 1958. The increase was mainly in plate, sections, and tinplate, and trade was assisted by the American steel strike, notably in tubes, tinplate, wire rods, and broad-flanged beams. Railway material exports fell sharply, partly on account of the general decline in exports to the Commonwealth. The fall in tube exports in the second half of 1958 continued in the first half of 1959. However, new Middle East orders increased exports in the second half-year by 17 per cent. over the first half. The excess of exports over imports at £146,000,000 was a record.

Prospects for 1960

The durable consumer goods industries are booming and investment is rising. The fall in consumers' and merchants' stocks has stopped and some rebuilding is expected. Home demand should remain strong, and although the export market is, in general, firm, sales of sheet, tinplate, and reinforcing bars will probably be restricted by the claims of the home market. Average capacity will reach 25,500,000 tons in 1960, mainly by additions at the wide strip mills and at billet plants. Imports will be mainly of sheet.

The Iron and Steel Board and the British Iron and Steel Federation worked with the British Standards Institution on new revised standard specifications for steel. The meeting of the Commonwealth Standards Conference in Ottawa last summer concluded that broad-flanged beams and columns are likely to be widely used.

Raw Materials

There was no shortage of raw materials last year. Between mid-1958 and mid-1959, the fall in steel production led to a scrap surplus. The board discussed with the industry the desirability of stocking surplus scrap, but it proved impossible to work out a scheme. Exports were, therefore, permitted in the latter part of 1958 and the early months of 1959. By that time, arrangements were made to stock 200,000 tons of shipbreaking scrap and to maintain the level of stocks at works. Exports of certain of the poorer grades were permitted up to December 8. Total exports in 1958-59 reached 1,200,000 tons.

Pig-iron output in 1959 was 12,600,000 tons, compared with 12,800,000 tons in 1958 and 14,300,000 tons in 1957. This year there will be capacity to produce 17,500,000 tons of iron and output is provisionally estimated at 16,000,000 tons or sufficient to produce 24,000,000 tons of steel and 3,800,000 tons of iron castings.

Imports of iron ore in 1959 were 13,300,000 tons, as compared with 12,900,000 tons in 1958 and 15,900,000 tons in 1957. The cutting of imports meant that ore carriers continued to be laid up in the early months of 1959, but when iron and steel production increased all were brought back into use later in the year. At the end of 1959, 50 specially designed ore carriers out of a planned fleet of 71 were in service. Home production of iron ore in 1959 at 14,900,000 tons was 300,000 tons higher than in 1958 and substantially less in 1957.

Coke consumption in blast furnaces and sinter plants fell, partly because of the cut in iron output and also because of greater efficiency brought about by using larger and more efficient furnaces and by greater use of material preparation techniques, notably sintering. The total amount of coke delivered to the blast furnaces fell last year by 7 per cent. and the amount supplied from the industry's own ovens fell by 6 per cent. and that by merchant plants by 15 per cent. The fall in purchases from outside suppliers would have been greater but for arrangements for sharing the burden of the fall in consumption between the industry's and outside ovens.

Development and Research

Early in the year the Iron and Steel Board approved two large schemes to increase the output of wide strip mill sheet, namely (1) the new integrated iron and steel works to be built by Richard Thomas & Baldwins, Limited, at Llanwern, near Newport, and (2) extensions of the Ravenscraig Works of Colvilles, Limited, with cold-rolling facilities at Gartcosh. The buoyant demand for sheet made it necessary for the board to examine yet again the estimates of future demand and supply for strip mill products and, in the autumn of 1959, the board set in hand a reassessment of the likely demand for these products in the years up to and including 1965 and at the same time invited the makers concerned to submit proposals for increasing their manufacturing capacity. The reassessment of future demand was undertaken in consultation with the main industries that are users of sheet steel, with Government departments and with the British Iron and Steel Federation, and it resulted in fresh figures of demand being prepared last November.

The new RTB scheme was to enable production at Llanwern to start in 1962 instead of 1963 and to extend the initial capacity there by 235,000 tons of cold-reduced sheet a year. The company hopes to start production before the end of 1961. The Iron and Steel Board attaches the greatest importance to the achievement of the new dates now forecast, but in estimating future supplies, full output from this and other new works has been discounted. The RTB scheme now includes a fully continuous 68-in. wide hot strip mill in place of the semi-continuous mill previously envisaged.

Revised proposals from Colvilles envisage the production of 500,000 tons of sheet (270,000 tons more than previously planned) and 175,000 tons of light plate on the new 68-in. semi-continuous hot strip mill, which is expected to start in July, 1962. At Gartcosh, a four-stand tandem cold-reduction mill is being built (instead of two single-stand reversing mills previously planned). This, it is hoped, may be ready by October, 1961.

These extensions of the original plans will make the plants more economic, but both hot mills will still have substantial spare capacity. The sub-

mission of a scheme by the Steel Company of Wales, Limited, which included a new 48-in. hot mill at Port Talbot, therefore presented the board with a serious problem. But the scheme had attractive features. A 48-in. mill would have been useful for rolling tinplate base and setting the existing 80-in. mill free for rolling more wide material. Moreover, the scheme provided for continuous casting of slabs—the first time on a commercial scale in the UK. However, a sixth strip mill would have brought capacity much in excess of estimated demand for several years ahead and some existing hot mills would have been operating much below the economic level.

The excess capacity of finished products, however, was much less, and the board, not wishing to discourage commercial enterprise, suggested that the Steel Company of Wales should omit the hot mill and investigate the possiblity of RTB processing the additional SCOW slabs at Spencer Works and returning the resulting coils to SCOW for finishing. This suggestion was adopted and the rest of the scheme approved on condition that arrangements should, as soon as possible, be made to enable larger ships to be used for carrying ore to the company's works.

The arrangement is advantageous to both firms and to the national economy. The RTB hot mill will have a more economic load, the SCOW will be able to make the most efficient use of the rest of its plant, and will save £13,000,000 of capital, the servicing of which would have cost far more than will the extra transport involved.

The board's special committee on home ore has reported to the board since the end of the year under review. It seems clear, the annual report states, that considerably more home ore will be used in the 1960s.

Long-term Development

The examination of possible demand in the middle 1960s and onwards to 1970 has continued in conjunction with all interested parties. Producers will in due course be asked for their future production plans so that a further development report can be prepared. Capacity is elected to increase from 25,500,000 tons in 1960 to 29,000,000 tons in 1962 and a production of at least 32,000,000 tons in 1965 appears possible.

The estimated cost of fresh proposals is £200,000,000, including £140,000,000 for the two strip mill schemes. This compares with £115,000,000 in 1957 and £41,000,000 in 1958. Among proposals approved are additional tinplate capacity at Ebbw Vale (RTB) and at Trostre (SCOW); a new billet mill at RTB's Redbourn Works; replacement by electric-arc furnaces of the open-hearth melting shops of Steel, Peech & Tozer; continuous casting plant at Barrow Steel Works for the production of 2-in. billets; modification of section mills at Appleby-Frodingham, South Durham (Cargo Fleet Works), and Colvilles (Lanarkshire Works); a continuous wire rod mill at Lancashire Steel; and a further cold mill at Shepcote Lane for stainless steel strip.

The "M" scheme of the Steel Company of Wales, designed to raise ingot capacity to 3,000,000 tons, was completed in 1959. Brymbo Steel Works, makers of special quality billets, completed the modernization of its steelmaking facilities. Other major schemes completed included the following:—Sinter plants at Bairds & Scottish Steel, Dorman Long, Stanton Ironworks, and Shelton; blast furnaces at Bairds & Scottish Steel, Millom, and South Durham; rolling mills at Appleby-Frodingham (slabs), Dorman Long (rod, bar, and narrow strip), Lancashire Steel (billets), Patent Shaft (plate), and Stewarts and Lloyds (Bilston) (semi-finished steel).

Developments in Progress

The completion date of the new South Works of South Durham (plate) is now given as 1961, not 1962. Developments at John Summers (sheet) should be completed in 1960, as should the reconstruction of the Hallside Works at Colvilles (alloy billets), the new plate mill at Consett, and a cold mill (narrow strip) at Steel, Peech & Tozer.

The ironfounding industry is still composed largely of medium-sized and small units, although over the past 10 years the number of foundries and

SIR ROBERT SHONE
(Executive Member, Iron and Steel Board)

of workers employed has fallen. Capacity has increased with mechanization. Several modern plants have been built in recent years.

The L-D oxygen process is to be installed in the RTB Spencer Works, in the new Ravenscraig melting shop, and at Consett, which will also install Kaldo vessels. The pilot continuous casting plant at Barrow has successfully cast slabs as well as billets. A UK team has been to Russia to study this process, where it is stated to be an established manufacturing technique. Many ironfoundries are using new production methods and improving the quality of their castings. Newer types of high-duty and high-strength irons are being developed.

The board is inquiring into the adequacy of research on the iron and steel industry and has

already collected information on the amount spent in this field.

Costs and Prices

With foreign ore cheaper and wages slightly higher in 1959, total costs fell by about 1 per cent. Technical progress reduced capital costs. In future, new steelmaking techniques should cut capital costs per ton of capacity and partly offset the post-war tendency towards rising cost of plant and capital.

In June all prices were reduced, the average fall being just over 1 per cent. In September some detailed changes were made. Quantity allowances were extended in June giving producers and consumers the benefit of long runs and giving better loading of railway wagons.

The board has continued to use as its criterion the costs at new plant using fully proven modern techniques.

The value of home sales of steel products whose prices were controlled by the board was £675,000,000 in 1959 (£650,000,000 in 1958) and of exports, £125,000,000 (the same as 1958). UK prices are substantially below those of the US. UK open-hearth quality is cheaper than the comparable European material, except some French sections and bars. European Thomas quality steels remain generally cheaper than UK open-hearth quality.

Steelmakers in all countries quote a basis price for a standard specification (generally of the cheapest commercial quality and defined as to quantity, size, and delivery zone) with extras or allowances for variations from that specification. In the UK the board keeps these extras under continual review to ensure that they represent real cost variations from the basis material and that one specification is as attractive as another. The importance of a realistic price structure is that inconsistencies could lead to shortgages in times of high demand and undue diversification of production.

International Relations

The Council of Association, in whose work the board participates, met twice in 1959. The chairman of the board is a member of the council. The Steel Committee of the council regularly reviews the market situation in the UK and in the Community and has continued to study raw material problems, long-term development, and iron and steel costs and prices. Much useful information resulting from these studies has been made available to iron and steel producers. Co-operation on technical matters has continued. There is a regular informal exchange of information between the staffs of the board and the High Authority.

Representatives of the board have continued to act as advisers on iron and steel matters to the UK delegates to the Organization for European Economic Co-operation and the Economic Commission for Europe.

The board was consulted by the Government in regard to the establishment of the European Free Trade Association and advice was given on such matters as rules for the base date tariff and definition of origin. The board has continued to be consulted by the Government on the temporary suspension of import duties. Under existing orders, duties on motor-body sheet, coils for re-rolling, and high-carbon wire rod are temporarily suspended until January 1, 1961.

Referring to the closure of works the report states that the recession led to further closure of old-type iron and steel works, but fewer than in previous years. A relatively large number of foundries closed, as a result partly of the fall in demand and partly of the tendency for engineering firms to buy rather than make their own castings.

The board's inquiry into pricing arrangements is virtually complete. Two associations have terminated their pricing arrangements along with all other arrangements. Other associations which formerly laid down minimum prices have cancelled them in favour of recommended prices. The board has continued its examination of other arrangements in the industry and three have been cancelled. Arrangements between iron and steel producers and raw material suppliers have also been examined and are being kept under review to see that they are advantageous. The board is inquiring into arrangements concerned exclusively with the export market.

Record Blast-furnace Campaign with British Refractory

FIRST blast furnace in the UK to use a British Super-duty firebrick for its complete stack lining has just finished its initial campaign; the results achieved are stated to have been outstanding. This is the United Steel Company's "Queen Bess" furnace at the works of the Appleby-Frodingham Steel Company. The stack was lined with MR2 bricks manufactured by Morgan Refractories, Limited, Neston (Ches), a member of the Morgan Crucible Company, Limited, group. The MR2 was the first Super-duty blast-furnace firebrick to be produced in the UK.

After operating for 49 weeks, the furnace was shut down in 1958 owing to trade recession, but after re-blowing in, it completed an operating campaign of 131 weeks before the unit was taken off for structural repairs to the auxiliary equipment. During its campaign the furnace produced 920,700 tons of iron involving a throughput of 2,450,000 tons of burden and 750,000 tons of coke. Throughout the entire campaign the burden consisted of 100 per cent. sinter. The tonnage handled by the furnace on such a practice is a record for Appleby-Frodingham. With the sinter containing 36 per cent. of iron, 26 cwt. of slag was produced with every ton of iron, giving a total liquid output of more than 2,000,000 tons.

THIRTEEN YEARS after production of Dexion slotted angle first started in a tiny building at Chingford (Essex), a new factory, standing on an eight-acre site at Hemel Hempstead (Herts), has been opened. Production, previously spread over three factories, is now concentrated at Hemel Hempstead where there is 150,000 sq. ft. of floor space.

Bretby Conveyor Lifter

COLLABORATING with the staff of Bestwood Colliery, Area No. 6, East Midlands Division, the National Coal Board's Central Engineering Establishment has designed and manufactured a conveyor lifter for quick and easy elevation of armoured face conveyors for horizon fixing and for inspection of the chain on the return side of the pans.

To advance an armoured face conveyor horizontally, double-acting rams are used, powered by a water-emulsion pump located in the gate road. On the other hand, the vertical movement required to fix the horizon is usually achieved by means of a commercial-type lifting jack. This method has

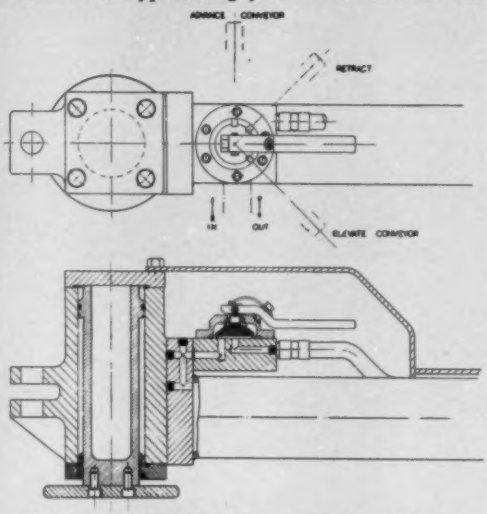


FIG. 1.—CONSTRUCTIONAL DETAILS OF THE BRETBY CONVEYOR LIFTER.

several disadvantages. Firstly, the operation of the jack is the full-time occupation of one man on each face. Secondly, in the event of a breakdown, with only one jack on the face it often takes a full shift to locate the point where the chain is broken or staked. Thirdly, the use of such a jack has serious drawbacks in low seams, where the operating lever has to be very short.

The Bretby conveyor lifter consists of a jack which is designed for incorporation with a ram, so that the combined piece of equipment can be used for all the required operations. Figs. 1 and 2 show the jack combined with a Bonser ram, but any other type of ram could be used as the basis of the conversion.

The jack itself has a malleable-iron housing, on the front of which is integrally cast the slotted lug for attaching the jack to the standard spill-plate, the ends of the housing being closed by spigoted steel caps. Working inside the honed bore of the housing is a one-piece piston and rod; a circular footplate is attached to the bottom of the piston rod by two capscrews. The piston head is sealed by a rubber "O" ring and the piston rod end is similarly sealed by a rubber "O" ring mounted in the bottom cap. This lower seal and piston rod are protected by a rubber "wiping" seal which cleans the rod when the jack is being retracted. Drilled holes in the housing direct fluid to the upper or lower side of the piston.

To convert a standard Bonser ram so that it will accept the jack, it is necessary to remove the two lifting lugs and machine a smooth vertical face on the ram head. Four capscrews are then used to hold the two units together. The standard valve housing is replaced by a new unit, mounted on the same two screws, but incorporating extra drillings

FIG. 2.—BONSER RAM FITTED WITH HYDRAULIC JACK FOR LIFTING ARMOURED FACE CONVEYORS.

to perform the additional functions. Operation of the control handle, which is shown in the neutral position in Fig. 1, then gives the following sequence of operations:—Handle "east": jack retracted, extend ram; handle "south-east": jack retracted, retract ram; handle "south" (neutral): jack and ram retracted; handle "south-west": elevate jack, ram retracted; handle "south" (neutral): retract jack, ram retracted.

It should be noted that in all positions the underside of the jack piston is fed from the pressure supply. This ensures that when the top of the jack is open to exhaust there is sufficient pressure on the underside to oppose return line back-pressure which would otherwise elevate the jack.

To protect the valve unit from damage, a new guard has been designed. It is supported at the front on the jack housing, at the rear by the ram housing, and along its length by distance pieces off the ram tube. The flexible ram feed pipe is still used, but has been moved to one side to reduce the height of the installation and facilitate travelling along the face over the rams, particularly in low seams.

Particulars of the unit are:—Type—double-act-

ing jack; fluid—oil and water emulsion; stroke—6 in.; bore—3 in. dia.; lift at 1,000 lb./sq. in.—2.19 tons; overall height (retracted)—10¼ in.

The usefulness of the installation has been proved by experience underground at Bestwood Colliery, where one face is fully equipped with 30 rams. On this face the combined units are set at 7-yd. intervals and the simultaneous operation of three adjacent jacks lifts the conveyor complete, with little catenary effect on the conveyor between the jacks. This facilitates inspection of the bottom chain, and 80 yd. of chain have, in fact, been replaced in only 1¼ hr. on this face.

World Standards for Protective Helmets

BRITAIN is taking the lead in an attempt to get world-wide standards adopted for safety headwear worn by road users and mining and other industrial workers.

On the initiative of the British Standards Institution, the Protective Headwear Manufacturers Association, and other safety interests, a new committee of the International Standards Organization has been set up. The committee will hold its first meeting in London from October 12 to 14. It will be attended by helmet makers, safety organizations, Government representatives, and other experts from many parts of the world.

Aim of the committee will be to agree on world standards for the quality and testing of safety helmets. Firms in the UK believe that the present British Standards for motor-cyclists', racing car drivers', and industrial workers' helmets are among the highest in the world, and they naturally hope that any recommendations which the new international committee evolves will be substantially in line with existing British practice.

The London meetings will afford the first real opportunity for an exchange of research data and views on head protection by means of safety helmets and for the promotion of their use. International standards for protective helmets would be especially welcomed, it is thought, in developing countries which are not yet so safety conscious and do not have standards of their own.

The co-ordination of manufacturing and testing methods between different countries would probably make it easier for helmet manufacturers in Britain to export their products to other countries.

It is planned to take the delegates to the London meetings to the British Standards Institution's test centre at Hemel Hempstead on October 12.

BRITISH DRILLING MACHINES FOR RUSSIA

ENGINEERS of the USSR trade delegation in Great Britain recently witnessed field trials at a Derbyshire quarry of a drilling machine of revolutionary design. The first of 15 similar tracked tower drill rigs destined for Russia, it is part of an order already announced worth over £250,000 won by the Holman group subsidiary, Climax Rock Drill & Engineering, Limited, in conjunction with F. Taylor & Sons (Manchester), Limited.

This mobile machine is revolutionary in that four drifters (Holman medium weight SL280 drills mounted on power-feed cradles) can be operated simultaneously

ONE OF THE 15 TRACKED TOWER DRILL RIGS ORDERED BY RUSSIA UNDERGOING FIELD TRIALS.

by two operators and are capable of drilling a rock face from ground level up to 32 ft. high and with a horizontal span of 24 ft. It was proved at the trials that the rig was very stable under drilling conditions even when the platform was in the highest position, the hydraulic booms in the highest position, the drifters spread out to their full width of 24 ft., and the tracks standing on a gradient of 1 in 10.

Four holes can be drilled simultaneously to a depth of 13 ft. and Russian requirements will vary from horizontal holes, slightly dipping holes, to holes angled up to 30 deg. Holman 2¼-in. tungsten-carbide tipped bits will be used and drilling speeds of 16 in./min. are expected.

The booms and collapsible tower are hydraulically

(Continued at foot of previous column)

operated and are remote controlled from panels on the platform above the tower. The tower is mounted on electrically driven tracks which can negotiate rough and uneven ground, gradients of 1 in 7. Crowding rams of 30-in. stroke are provided so that the feed cradle can be pushed up to the rock face. For movement in confined spaces underground the tower can be collapsed to a height of 11 ft.

Electric motors of 40 h.p. and 7½ h.p. are provided for track drive and hydraulic pump drive, respectively, and a compressed air supply of approximately 700 cub. ft./min. is required.

BISRA Steelmaking Conference

ALL-BASIC OPEN-HEARTH FURNACES

Continuing its exclusive report of the 54th Steelmaking Conference of the British Iron and Steel Research Association, held recently at Harrogate, IRON AND COAL *publishes this week the remaining papers of the session on "Properties of Basic Roof Bricks," which deals with British and American experience, and the first of the papers on "All-Basic Furnace Operation."*

EFFECT OF BRICK QUALITY ON ROOF PERFORMANCE: BRITISH EXPERIENCE

By J. R. LAKIN* and J. MACKENZIE*

IN the Journal of the Iron and Steel Institute, March, 1957, the All-Basic Furnace Subcommittee published details of a series of co-operative trials on all-basic furnace roofs. On the basis of an exhaustive laboratory examination of seven different bricks and 11 roof panel trials on five furnaces, it was concluded that roof design and operating variables had a far greater influence on roof life than observed differences in brick quality. Some reference was, of course, made to the characteristics of the best bricks and the conclusion was drawn that volume stability at 1,700 deg. C. and good refractoriness-under-load values or low creep rate were important properties, but that the iron oxide bursting index was not. Some non-committal views on thermal shock resistance were expressed, but the general feeling was that resistance to thermal shock was a desirable property.

Following this work, there were few roofs in operation in Britain and little opportunity to carry out any systematic study of the relationship between brick properties and roof performance. The emphasis did, however, remain on fired chrome magnesite bricks and research effort in brickmaking was directed along the lines indicated by the earlier work, *i.e.*, improvement in high-temperature stability and strength largely by emphasis on firing technique.

Main Stimulus in Britain

The main stimulus to basic roof usage in Britain came with the entry of Appleby-Frodingham into the field. Here, a relatively simple design was used and operating conditions, particularly in regard to fluctuations in roof temperature, were fairly constant. There have now been some 50 roofs at Appleby-Frodingham other than those on the oxygen Ajax furnaces and the properties of each have been examined in detail.

It soon became apparent that there was some relationship between roof life and a brick property factor which was compounded from the silica content, the high-temperature strength measured in torsion, and the permanent volume contraction after reheating to 1,700 deg. C. for two hours. The technique of measuring high-temperature creep and strength in torsion has been described elsewhere (Trans. Brit. Ceram. Soc., 57, 187, 1958). The figure used for assessment is the twist in radians on the standardized specimen after one hour at 1,300 deg. C. under a load 5.63 lb.-in.

The range of results obtained on many different brands of fired chrome-magnesite roof bricks is as follows:—Silica content: 2.49 to 6.54 per cent., typically 3.8 per cent. After contraction: +0.4 to −8.3 per cent., typically −1.0 per cent. Torsion twist: Failed to 0.004 radian, typically 0.020 radian.

Latterly, and as more results were accumulated, the significance of contraction was reduced and the index currently used is the reciprocal of the twist in torsion (radian × 10^3) + five times the silica content (per cent.). The relationship between this index and performance at Appleby-Frodingham for various bricks is shown in Fig. 1. This clearly shows that the higher the index, *i.e.*, the lower the silica content and/or the higher the strength, the better the performance in service. The suppliers of fired chrome-magnesite bricks have therefore been asked to produce materials which conform to these recommendations.

In other plants, for example at Steel, Peech & Tozer, this relationship between properties and performance is denied, presumably because of the overriding influence of design and operating

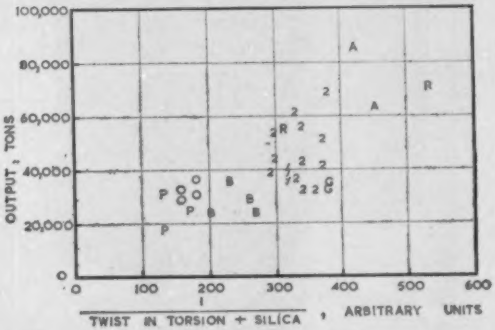


FIG. 1.—RELATIONSHIP BETWEEN PROPERTIES AND PERFORMANCE OF BASIC ROOF BRICKS.

* The United Steel Companies, Limited, research and development department, Moorgate, Rotherham.

characteristics. This relationship is also denied for unfired bricks since these have a low strength in torsion at a temperature of 1,300 deg. C. There is, however, no reason to suppose that the preferred chemical composition of an unfired brick should be any different from that of a fired brick.

It is not completely clear why a relationship of the type described should exist. If deterioration of a basic roof brick is associated with the development of a zone rich in silicates and of low refractoriness and strength, the amount of silicate, its distribution in the original brick, and the brick texture will all be of importance. The amount of silicate is, of course, largely determined by the silica content and the inference is therefore that low-silica chrome ores should be used. Torsion strength and high-temperature contraction are functions not only of the amount of silicate but also of its distribution and the general brick texture. The ideal brick—and it does not seem to matter whether it is a chrome magnesite or a magnesite chrome—is one whose raw material characteristics, both chemically and physically, and firing treatment promote direct bonding of magnesia to chrome. The reliance on a silicate glue to bond magnesia and chrome is a weakness because the high-temperature properties of the brick are then determined largely by the properties of the silicate.

EFFECT OF BRICK QUALITY ON ROOF PERFORMANCE: AMERICAN EXPERIENCE

By W. S. DEBENHAM (*United States Steel Corporation*)

ANY comparison of English and American basic open-hearth roof brick is essentially a comparison of the merits of burned and unburned brick.

FIG. 1.—INTERRUPTION OF PEELING BY INTERNAL STEEL PLATES.

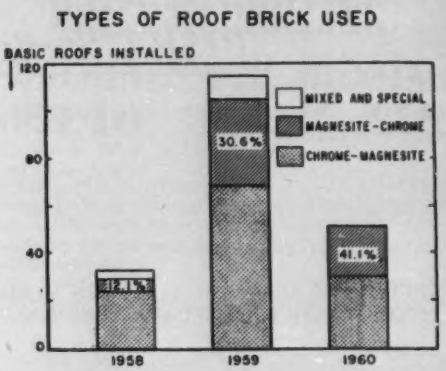


FIG. 2.—PROPORTIONS OF VARIOUS ROOF BRICKS USED IN 1958-1960. NOTE INCREASE IN PROPORTION OF MAGNESITE-CHROME BRICKS.

Neither country to my knowledge has had a great deal of experience with the type used by the other, and such experience as has been gained has generally served to convince each that they were already on the right course. Unburned bricks were first produced in the United States about 1923, and prior to their consideration for basic roofs had already been widely used in frontwalls, endwalls, and even subhearths of open-hearth furnaces and in copper-furnace roofs.

Dr. Chesters and others had made a great impression with their findings relating to iron oxide bursting, and the only available brick that had outstanding resistance to this reaction was an unburned chrome-magnesite brick. Also there had been good reports of such burned brick as Radex E, and so the first roof at the United States Steel Corporation was a composite of the burned American equivalent of this brick, another burned brick, and the unburned type. The unburned brick won the honours, and still remains undefeated by any burned brick, although several have been put against it. However, the lives of these early roofs were not particularly impressive. The brick supplier, spurred by the desire to keep alive the only basic roof left in North America stuck a steel plate in the middle of the brick. This helped somewhat and so made it easy for the supplier to reason that if one plate could break up and minimize peeling, then two plates should be better than one. So two plates have been with us ever since. Fig. 1 shows the interruption of peeling by the plates.

Experience with Unburned Bricks

When the sudden turn to basic roofs came, this unburned chrome-magnesite brick with two internal plates was well established as the most likely roof brick, so it was natural to continue with it, particularly as the emphasis was now on roof design. It was not until late 1957 that a comparable competitive brick was developed: its

first installation was in June, 1958. This is a magnesite-chrome brick with approximately the reverse of the 60/40 ratio of the chrome-magnesite brick, but similarly sized with coarse chrome ore and fine magnesite, and also with two internal plates. This brick has done well from the start. In a number of split roof trials with chrome-magnesite brick, it has been observed that the first peeling action often occurs in the magnesite-chrome brick, but that it usually goes longer to the first patch and is thicker at the end of the campaign.

So far there have been only 15 campaigns in US Steel with the magnesite-chrome brick. These gave an average unit roof life of 391, as against 53 campaigns with the chrome-magnesite for an average life of 381 heats. A fairer comparison using only data from comparable shops, gives 26 campaigns of chrome-magnesite averaging 357 heats against 355 heats for 12 magnesite-chrome campaigns, a practically equal performance. Thirteen other campaigns of mixed roofs and other brands of chrome-magnesite and magnesite-chrome brick have averaged only 309 heats. Fig. 2 shows the growing proportion of magnesite-chrome brick roofs we have installed since 1958.

Considerations of Composition

As yet we have no fixed ideas as to what the best roof brick composition might have emerged. While operating only the one basic furnace, an orderly exploration of higher MgO compositions was attempted, but little has been done recently, the main attention being given to the quality of the two established types discussed above. In this connection, the correlations that have been established in the United Kingdom between roof life and such properties as the torsion test behaviour, high-temperature volume stability, and silica content of burned basic brick are especially interesting. While our results show the desirability of a low silica content, our unburned bricks present problems from a testing standpoint. Such

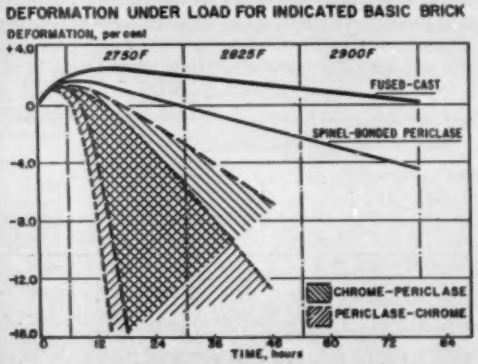


FIG. 3.—HIGH-TEMPERATURE BEHAVIOUR OF MAGNESITE-CHROME AND CHROME-MAGNESITE BRICKS.

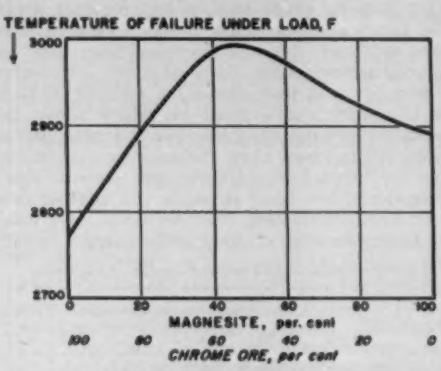


FIG. 4.—LOAD CHARACTERISTICS RELATED TO CHROME-MAGNESITE CONTENT.

bricks lose considerable strength at intermediate temperatures of 800 to 1,250 deg. C., and if too great, this weakening can contribute to service failure. This characteristic, and other properties such as porosity, density, and temperature of failure under load, are all related to the type of chemical bond, the moisture content, and the pressure employed in manufacturing. Fortunately, all these properties can be near their optimum under one well-controlled set of manufacturing conditions. However, if variations in sizing, proportioning, or in grain porosity cause changes in moisture content or pressure, these properties may suffer.

For evaluating high-temperature behaviour, our principal method has been a creep test in which the brick is heated to 1,510 deg. C. (2,750 deg. F.) under a load of 25 lb. per sq. in. in 6 hr., held 24 hr., and then heated and held at 1,550 deg. C. (2,825 deg. F.) another 24 hr. or until more than 15 per cent. deformation occurs. Fig. 3 shows the range of results obtained for magnesite-chrome and chrome-magnesite bricks. The latter range slightly higher. On a rising temperature test, failure usually occurs in a temperature range of 1,600 to 1,670 deg. C. (2,910 to 3,040 deg. F.). It has not been possible to establish any correlation between these ranges of results and service behaviour.

Samples of brick from nearly every roof have been checked for porosity, density, chemical composition, and by the two types of load tests. The range of values are shown in Table 1.

While hesitating to suggest that the variations in-

TABLE 1.—*Basic Roof Brick Properties.*

	Chrome-magnesite.	Magnesite-chrome.
MgO	36–49	60–64
Cr_2O_3	18–24	12–15
Al_2O_3	15–23	10–14
Fe_2O_3	8–11	5–8
CaO	0.8–1.3	1.0–1.5
SiO_2	4.5–6.7	4.5–6.2
Porosity, per cent. ..	18–24	18–24
Density, g/c.c. ..	2.82–3.07	2.75–2.97

dicated have no effect on roof life, the fact is that under the wide, obscuring range of service conditions in which these bricks have been used, no good correlations have been obtained. However, low porosity and low lime silica content, particularly the latter are stressed as values above this normal range have definitely affected roof performance. Thus, one early failure was associated with a roof brick having 26 per cent. porosity and a corresponding low bond strength. In another case, a roof brick containing 8·3 per cent. SiO_2 failed early from excessive spalling and peeling.

TABLE 2.—*Chemical and Physical Properties of Magnesites.*

Grade.	Source.	Chemical analysis, per cent.					Bulk density, g/cc.
		MgO	SiO_2	CaO	Al_2O_3	Fe_2O_3	
95	Brucite	95.0	2.6	1.5	0.3	0.2	3.28
94	Sea water ..	94.6	2.8	1.5	0.4	0.7	3.16
96	Sea water ..	95.9	1.7	1.3	0.4	0.7	3.08
96	Brine	96.3	1.6	1.1	0.4	0.6	3.01
98	Brine	97.8	0.6	1.1	0.3	0.2	3.22

There is some evidence to suggest that the two grades of brick so widely used in America may represent the limits of the optimum range in the chrome-magnesite series for roof service. Thus, bricks of the 40-60 chrome range not only give good service but show the best load characteristics, as indicated in Fig. 4. It has been suggested that an intermediate composition of about 50-55 per cent. MgO may be best, as normal variations would still fall in the desired range, but neither the value of a 50-50 composition, nor 60 per cent. MgO as an upper limit have yet been established. However, it has been noted that magnesite-chrome bricks in the range of 67 to 72 per cent. MgO to date have not been as consistent performers in service as the bricks in the 40 to 60 per cent. range.

Regarding silica content, it must be said that British basic brick manufacturers have done an excellent job of reducing the percentage below 4 and even 3 per cent. In America the improvement in magnesite quality (see Table 2) is being partially offset by chrome ore of higher silica content because American roof bricks are made almost exclusively with Philippine chrome ore and the maximum silica specifications for required grades of this have recently been increased from 5 to 6 per cent. Hence, reluctantly, other sources are being tried, but to date bricks produced from other chrome ores are not impressive.

However, the better grade magnesites will produce bricks which, even using Philippine chrome ore, will fall substantially below the 4 to 6 per cent. SiO_2 range of present American roof bricks, particularly in the magnesite-chrome type. Trials of such brick are now starting.

FIG. 5. — SECTION THROUGH A USED SPINEL BONDED MAGNESITE ROOF BRICK.

Magnesite Bricks

Past experience with straight magnesite brick made of the purest magnesite then available had indicated that some deterrent to spalling was still needed. From a study of various spinel compositions a spinel bonded magnesite brick was finally selected which was composed of 8 per cent. fine alumina added to a 95 per cent. MgO grade magnesite. This brick burned and plated, was made up for us and tried in the roof of a 320-ton furnace. This roof lasted 388 heats for a unit life of 350 heats, or approximately shop average. The roof brick did not crack or spall or show the normal depth of oxide penetration, but wore away by simple melting. Fig. 5 shows a section through a used brick. The cracks that can be seen were incurred on removing the brick. It exhibited the characteristic of high conductivity, and in the latter half of the campaign would change from dark to bright red from charge to tap on every heat. When tried in front walls, this brick proved quite variable, at times giving superior results and at others being severely eroded, thus seeming to be very sensitive to slag composition and temperature.

These experiences with a brick having less than half the Al_2O_3 content of some conventional chrome-magnesite bricks suggest that Al_2O_3 combined with MgO is not enough, and that it may be a component of basic brick only as part of a chrome spinel. While there may be doubts about the value of such chrome-free compositions, it is interesting to note the effect of the quality of magnesite used on the properties of the spinel brick made experimentally, as shown in Table 3.

TABLE 3.

Magnesite.		Per cent. linear change, 1,760 deg. C. reheat.	Temperature failure under load.	Spalling resistance.
Per cent. MgO	Per cent. SiO_2			
			Deg. C.	
88	4.0	— 4.9	1,500	Poor
93	4.5	— 5.9	1,505	Fair
95	2.3	— 2.8	1,680	Good
97	1.1	— 0.4	1,720	Very good

With purer magnesite and lower Al_2O_3 content the spinel brick may be worth another try. However, many properties of magnesite, particularly spalling, are so improved by increasing purity that it seems possible that some of the better grades may be able to stand alone as a roof refractory, and if made unburned, the conductivity might be

tolerable. The reported success of unburned, internally plated brick made entirely of magnesite of only 90 per cent. MgO content in various European installations is most encouraging to this view.

Another interesting experiment was conducted with Russian-type roof bricks in the Russian roof design at Fairless Works. Two suppliers duplicated the composition and grain sizing faily well, although using Philippine chrome ore. The bricks were also plated but in the 15-in. by 6-in. by 3-in. wedge shape reported by the Russians. Two roofs were installed, one with the Russian design and one with the Fairless design. No expansion was provided and in neither case was the roof restricted while cold, this being in accordance with Russian practice. Both roofs rose and fell and distorted slightly with temperature changes, and this behaviour contributed to the heavy peeling and the eventual disappointing roof life, which was 295 heats for the Russian type roof and 289 heats for the Fairless roof. Others have tried this Russian brick with fair success and a further trial of the brick is scheduled at another plant of United States Steel Corporation.

Fused-cast Bricks

Fairly persistent efforts over a four-year period have so far failed to establish fused-cast chrome-magnesite brick as an economically attractive roof brick in the United States. Several campaigns recently reported by Republic Steel have averaged 200 heats unit roof life, with a brick consumption of 5 lb. per ton. The best campaign so far reported showed a unit roof life of 382 heats in a shop in which conventional magnesite-chrome brick gave 500 heats. It appears that there is a case for the so-called pliant structure and yielding behaviour so evident in unburned brick. Quite possibly, for some roof designs, this pliancy is excessive, and could figure prominently in the poor performance of unburned brick in some roofs, particularly those in which the rise is low and no suspension means are provided. More clarification is needed on this point, and can be provided only through more controlled tests of burned and unburned brick under identical conditions. The results of the British trials now under way with American roof bricks and roof design at the works of the Steel Company of Wales, Limited, should be most interesting.

Conclusion

To sum up, the search for the ultimate in basic roof brick in America will be by:—(1) trials of chrome-magnesite and magnesite-chrome type bricks with lower impurity content, *viz.*, less than 1 per cent. CaO and down to 2·0 per cent. SiO_2. Such bricks may be obtained by either using a 98 per cent. MgO and Philippine chrome ore or a high-purity magnesite with low-silica chrome ores other than Philippine. (2) Trials to determine suitable procedures and compositions for making from friable ores, synthetic chrome aggregates for the manufacture of basic bricks. (3) Trials, having regard to the availability of high purity magnesites, of bricks of over 60 per cent. MgO up to and including unburned 100 per cent. magnesite bricks. Finally, progress with burned brick will be watched and trials conducted if thought of interest.

POTENTIALITIES OF FASTER DRIVING WITH PARTICULAR REFERENCE TO OPERATING COSTS

By Dr. A. H. Leckie*

THE attractive economics of oxygen converter practice for making steel from molten pig-iron, and of electric-arc furnace practice for making steel from scrap, have led some authorities to declare that the open-hearth is obsolete. On the other hand, supporters of the open-hearth point out that the advent of oxygen practice and of improved refractories can speed it up so that the costs remain competitive with those of its rivals. What are the potentialities of the faster driving of open-hearths? There are a number of factors to consider.

Combustion Factors

Not long ago the main problem was how to get as much fuel into the furnace per unit of time and to burn it efficiently. Those were in the days of producer-gas as a fuel; much research was done on port design, and relative areas and angles of the gas port, air port, and so on were talked of at most steelmaking conferences.

Nowadays, with high-energy fuel oil, coke-oven gas, and oxygen at our disposal, getting the fuel into the furnace and burning it there is much less of a problem. It is now possible to burn efficiently as much fuel as the manager wishes to introduce to the furnace space. The limiting factor is how much heat can be absorbed per unit of time by the material to be melted, and how hot it is possible to allow the roof to get while driving the heat into the charge. This means faster and yet faster charging, together with the backing up of an adequate incoming materials supply system, and the use of high-duty refractories in the roof, notably basic brick.

Chemistry Factors

In the case of hot-metal furnaces provision must be made for the increased vigour of the reactions when using oxygen for bath chemistry. There are limitations on how quickly the reactions can be allowed to go without running into loss of yield through iron coming over with the slag. Therefore, when using oxygen account must be taken of possible productivity loss due to having to put less material in the furnace to make room for increased activity of the bath.

But none of these involves serious technical problems, excepting difficulties of making improvements to existing plants where there are space limitations. Perhaps a more significant item is the need to instal some form of waste-gas cleaning, because of

* Chief technical officer, Iron and Steel Board. The opinions expressed are the author's and not necessarily those of the board.

the substantially increased chimney gas dust content when driving hard, especially when using oxygen. However, it is likely that all open-hearth furnaces, whether "oxygenated" or not, will take steps to reduce chimney gas dust because of the Clean Air Act, so it is not a problem particularly attached to faster driving. In this connection, however, some consideration might be given to using a common flue from several furnaces leading to one large gas cleaner, instead of having a separate unit for each furnace. Now that automatic damper control is so well established, the objections to a common stack should no longer apply, and this procedure might lead to some economy in capital and running cost.

Cost Factors

How does faster driving affect costs? It is common knowledge that cost factors may be divided into two broad groups:—(1) Those that are constant per unit of tonnage, such as raw materials, and (2) those that are constant per unit of time, such as plant capital costs. Increasing the output reduces only the costs per ton of the items in the second group. However, in the case of open-hearth furnaces these two groups are not always clearly distinguishable. Raw materials costs per ton, although they should be constant, may in fact change with driving rate because yields may change. Plant capital costs will rise somewhat as output goes up because more cranes and handling facilities will be needed, and this extra expenditure will reduce somewhat the saving in capital cost per ton.

Common costing practice divides the running cost into certain items which are, in the main:—Productive Materials (W); Productive Labour (T & W); Operating Supplies—mainly ladles, stoppers, moulds, and so on (W); Productive Services—in the main fuel and auxiliary energy (W); Maintenance (W); Works General Services (T & W); Departmental Charges (T). Some of these will depend on time, others on tonnage, as indicated by the letters T & W in parentheses above. Some will depend to a partial extent on both time and tonnage, for example, productive labour.

It is a fair approximation to assume that productive materials are a constant cost per ton irrespective of output. Some authorities claim that faster working gives an improved yield because of a lower slag bulk and less iron loss in the slag. Others say that faster working lowers yield because of fume losses and so on. There seems to be no real evidence either way, and for this reason a constant figure per ton is assumed in this study.

Productive labour is partly a time cost and partly a tonnage cost. Examination of a large amount of data from melting shops, suggest that a 50-50 division is fair. Operating supplies may be expected to follow output and therefore are a tonnage cost. The same applies to that portion of productive service costs represented by energy used for handling materials. Departmental charges may be fairly reckoned to be a time cost. The remaining items depend both on time and tonnage, and careful examination of shop cost data from a number of melting shops has led to the divisions shown for cold metal practice and hot metal practice in the discussion which follows.

The main items which require special consideration are maintenance and the component of productive services represented by furnace fuel. Fuel consumption per ton will generally fall as output increases, but the rate of fall is not necessarily linear at high driving rates and it is, of course, possible to "over-drive" a furnace so that fuel consumption per ton may even rise. The exact relationship requires full calculation of the furnace heat balance over a range of driving rates, which is too lengthy to discuss here, but the figures shown below for a cold-metal furnace have been obtained by this method.

The effect of output on maintenance costs varies in different plants. With fast driving, furnaces will wear out quicker and repair costs will be higher because of the need to use more expensive brick. But more steel will be obtained. As far as can be ascertained furnace maintenance costs do not change very much in terms of cost per ton of steel until rates of operation approaching those of the highly "supercharged" furnaces, such as those at Cornigliano, are reached. Figures published by Cornigliano show a rise. Maintenance costs on machinery will presumably remain roughly constant per ton of steel, because the amount the machinery is used will be in proportion to the steel made.

The calculations have been restricted to two examples, *viz:*—(1) Can faster driving of cold-metal open-hearth furnaces make them competitive with their chief rival—the electric-arc furnace?; (2) can faster driving of fixed hot-metal furnaces make them competitive with oxygen converters?*

Fixed Open-hearth Furnaces Operating on Cold Metal

Consider a shop with, say, six silica-roofed open-hearth furnaces each charging about 150 tons of cold material and tapping some 138 ingot tons of steel. In such a shop the furnaces would normally produce about 14 charges a week, that is, some 525,000 tons a year with a 45-week availability. Let us estimate the possible trend of costs when basic roofs are installed, and the charging and handling facilities and combustion arrangements improved so as to obtain 20 charges a week, which would put the shop output up to 750,000 tons a year. Oxygen-assisted combustion may be required, but with proper end-design and a high energy fuel it should be possible to get the combustion rates required without oxygen, and this method of working is assumed in the following discussion.

Suppose the standard furnace, before it is

* Faster driving of tilting hot-metal furnaces is covered by Mr. A Jackson's paper on the Ajax furnace.

"accelerated," has an operating cost of 100 units. Analysis of melting-shop cost figures suggest that the division of the items of the operating cost is as shown in the first column of Table 1. The second column shows how those figures should change (in the same units) when the output is increased from 14 to 20 charges a week. The tonnage items (W) do not change; the time items (T) decrease in inverse proportion to the increase in output rate. The reduction in fuel costs has been determined by the heat balance calculation referred to above.

TABLE 1.—*Analysis of Melting Shop Costs.*

	Standard practice (units).	Accelerated practice (all-basic) (units).
Productive Labour (T)	5	3.5
(W)	5	5
Operating Supplies (W)	13	13
Productive Services		
Furnace fuel	25	21.7
Auxiliary energy, etc. (W)	10	10
Maintenance (W)	30	30
Works General Services		
Dependent on time (T)	4.5	3.2
Dependent on tonnage (W)	2.5	2.5
Departmental charges (T)	5	3.5
Total	100	92.4

Table 1 shows that increasing the output by about 40 per cent. should lower the operating cost by about 7½ per cent. A better reduction is shown when capital costs per ton are considered. These are shown in Table 2 from which it is seen that the capital cost per ton is reduced by some 21½ per cent. through the accelerated working. The actual amount is 66s. per annual ton of ingot, or about 8s. 3d. a ton of ingots if capital charges are reckoned at 12½ per cent.

Recent studies of the economies of electric-arc furnaces for common steelmaking suggest that such furnaces may be somewhat more economic than normal open-hearth furnaces. The margin is not great, however, and an improvement such as that shown above should bring back the cold metal open-hearth into a strong competitive position.

TABLE 2.—*Cost of Cold-melting Shop with Six 140-ton Open-hearth Furnaces.*

	Normal silica practice (14 charges/ week).	Accelerated (all-basic) practice (20 charges/ week).
	£	£
Furnaces	2,000,000	2,200,000[1]
Cranes, etc.	1,000,000	1,400,000[2]
Ladles, materials handling, ingot moulds, etc.	1,000,000	1,400,000[2]
Buildings	2,800,000	2,800,000[2]
Services	1,350,000	1,350,000[2]
Total	8,150,000	9,150,000
Tonnage a year	525,000	750,000
Cost/annual ton	£15.5	£12.2

[1] Assume 10 per cent. increase for all-basic furnaces.
[2] Assume cranes, ladles, etc., increase in proportion to ingot output. Buildings and services remain the same.

Fixed Open-hearth Furnaces Operating on 50-65 per Cent. Hot Metal

Again consider a six furnace shop, containing furnaces tapping 200 tons. A typical performance today on silica furnaces would be about 14 charges a week per furnace which would give 756,000 tons a year on a 45-week availability. The results at Cornigliano show that with the intensive use of oxygen similar furnaces can be made to tap 30 charges a week, but the furnace availability falls by 15-20 per cent. which brings the available weeks back from 45 to 37-38, *i.e.*, a production of 1,350,000 tons a year.

Table 3 shows a breakdown of the melting costs. In the first column a typical melting cost representative of today's practice is taken as 100 units and the breakdown of the various components is based on analysis of data from a number of modern plants. The second column estimates what the comparable melting cost would be when operating the accelerated practice. The straight time elements are reduced according to the increased output. The furnace fuel costs, as with the fixed furnace, fall, but not in proportion to the output. In the case of an oxygenated hot-metal furnace it is not practicable to calculate the fuel consumption in quite the same way as for cold-charged furnace practice. The figures shown are based on typical data for "normal" furnaces and on Cornigliano's figures for an accelerated furnace; fuel consumption with the accelerated practice is about 60 per cent. of that used in standard practice.

According to Cornigliano, maintenance costs rise significantly, their figures have been used to calculate the increase shown.

TABLE 3.—*Breakdown of Melting Costs.*

	Standard practice (units).	Accelerated practice (units).
Productive Labour (T)	4	2.25
(W)	4	4
Operating Supplies (W)	12.5	12.5
Productive Services		
Furnace fuel (Ta)	20	12
Add for oxygen	—	4.15
Auxiliary charging, etc. (W)	7.5	7.5
Maintenance	35	38
Works General Services		
Dependent on time (T)	5.5	3.1
Dependent on tonnage (W)	2.5	2.5
Departmental Charges (T)	9.0	5.0
Total	100.0	91.0

Thus, increasing the output by some 75 to 80 per cent. reduces the production cost by 9 per cent. Cornigliano's published statement is that an increase of productivity by 53 per cent. decreased the production costs by 4 per cent., which is reasonable agreement.

As with the fixed furnace, the saving in capital cost is rather more pronounced than the saving in running cost. Table 4 estimates how these would be affected by adopting the accelerated practice.

Thus the capital charges are reduced by 33 per cent.

It is seen that speeding up the hot-metal open-

TABLE 4.—*Cost of Hot-metal Melting Shop with Six 200-ton Open-hearth Furnaces.*

	Normal silica practice (14 charges/week).	Accelerated practice (all-basic and oxygen) (25 charges/week).
	£	£
Furnaces and mixers ..	2,750,000	5,000,000
Cranes	1,200,000	2,100,000
Ladles, materials handling, ingot moulds, etc. ..	1,250,000	2,200,000
Foundations and buildings ..	3,800,000	3,800,000
Services	2,000,000	2,000,000
Total	11,000,000	13,100,000
Tonnage a year	756,000	1,350,000
Cost/ann. ton	£14.5	£9.7

hearth furnace in the way proposed reduces the operating cost by 9 per cent. and the capital cost by 33 per cent. How does this compare with the oxygen converter? This is not the place to discuss the relative costs of open-hearth and oxygen-converter steelmaking, and all one need say here is that from fairly intensive studies of oversea practice and the available published information it appears that in the oxygen converter the melting cost compared with normal open-hearth practice may be expected to fall by some 11 per cent. and the capital cost is £9 an annual ton. These figures can be only approximate, but they do suggest that speeding up the open-hearth furnace by intensive oxygen injection, as has been done at Cornigliano, may just bring the open-hearth furnace into reasonable competition with the converter.

Bearing in mind the uncertainties and approximations which must be attached to the calculation of costs in general terms, as distinct from exact figures for individual plants, the following conclusions are suggested:—

(1) The possibility of increasing open-hearth furnace outputs by the use of oxygen in conjunction with all-basic construction will probably not displace the oxygen converter and/or electric-arc furnace as the preferred units where an entirely new steelworks is concerned.

(2) However, it should be possible to make existing open-hearth plants competitive with oxygen-converter and electric melting shops by the use of oxygen-accelerated operation and all-basic construction.

(3) It follows there is a large latent increase in the capacity of many existing open-hearth melting shops, which may be exploited economically.

A BISRA Service

PEDIGREE IRONS AND STEELS FOR RESEARCH

TEN varieties of iron, 101 commercial quality steels, and 31 pure alloys—more than 70 tons of metal—are available to research workers and teachers who need specimens for their work.

The steel industry has always been generous in the provision of materials to research workers, but many workers are not familiar with the industry and do not know which firm to approach or how to specify exactly what they need. Sometimes, too, the materials required are not normal products of the industry. Because of this the metallurgy division of BISRA decided to establish a service for helping investigators by providing the necessary materials and giving expert advice. A store of "pedigree" irons and steels was started in 1949 and now contains more than 143 different materials. Well over 2,000 samples have already been provided, and the demand has risen steadily to about 400 samples a year.

A catalogue of the available materials is published periodically and is freely available. It gives details of the analysis of each material and of the mechanical properties if they are available. References to about 250 published works of research for which samples from the store were used are also given.

The advantages to be gained by using samples from this store are many; some are listed below:—

(1) A full analysis, including residuals, is available.

(2) In many cases it is possible to give the complete history of the sample; details of melting, casting, and processing are useful in many researches.

(3) Workers in laboratories not connected with the iron and steel industry, and having no particular metallurgical knowledge, can obtain the best possible materials for their proposed projects.

(4) Further samples of exactly the same material are usually available, even after a lapse of some years.

(5) Samples are provided with a minimum of formality.

(6) There are stocks of vacuum melted high purity iron and alloys which are not available commercially.

(7) It is possible to obtain samples on which there is already much published data. Preliminary testing can often therefore be avoided and results interrelated on a common basis. Such samples are often useful as standards.

The service is used regularly by universities, technical colleges, research establishments, and commercial organizations, and has an almost world-wide coverage. BISRA asks that, when a research programme is complete, it shall be acquainted with the results so that the fund of information about the materials can be increased.

Inquiries should be addressed to the British Iron and Steel Research Association, Metallurgy (General) Division, Hoyle Street, Sheffield 3.

New Literature

NEW catalogues, booklets, and other publications which have recently been received include those mentioned below. Readers interested in obtaining a copy of any of the publications referred to should apply direct to the addresses given, at the same time mentioning IRON AND COAL.

MOND NICKEL COMPANY, LIMITED, Thames House, Millbank, London, S.W.1—Abstracts of papers presented at three technical symposia form the basis of the May issue of the Nickel Bulletin.

FOUNDRY SERVICES, LIMITED, Long Acre, Nechells, Birmingham 7—Technical service, pressure diecasting, and shrinkage porosity are subjects featured in the April issue of Foseco Foundry Practice.

SIEMENS-SCHUCKERT (GREAT BRITAIN), LIMITED, Faraday Works, Great West Road, Brentford (Middx)—A new booklet dealing with electrical protection of portable and transportable apparatus by means of the company's earth leakage and/or monitored earth units is now available.

EVERSHED & VIGNOLES, LIMITED, Acton Lane Works, Chiswick, London, W.4—Featured in the May issue of Evershed News is an article by Mr. J. Bellis, the company's instrumentation engineer, on automatic control of an oxygen-blown converter plant at Ebbw Vale works of Richard Thomas & Baldwins, Limited.

WILD-BARFIELD ELECTRIC FURNACES, LIMITED, Elecfurn Works, Otterspool Way, Watford By-pass, Watford (Herts)—"Furnaces for the Production of Calcium Carbide," an article giving details of the modern closed top furnaces used in this important process, is included in the June issue of the Wild-Barfield Heat-treatment Journal.

DCMC DUDLEY COURT MACHINE COMPANY, LIMITED, 2a, Parkhurst Road, London, N.7—Full details and specifications of the first comprehensive range of aerosol packed industrial products, including colour coding paints, silicone mould release, rust inhibitor, all-purpose solvent, degreasing fluid, etc., are contained in "DCMC Industrial Aerosols."

AYR COUNTY COUNCIL, County Planning Office, County Buildings, Ayr—The unemployment situation in Ayrshire is causing some concern, as it is in some other parts of Scotland. The County Council, which is intensifying its efforts to attract new industry, has published a brochure aimed specifically at industrialists interested in expansion of business.

IMPERIAL CHEMICAL INDUSTRIES, LIMITED—Imperial Chemical House, Millbank, London, S.W.1—The ICI Magazine is a monthly published for the interest of all who work in ICI, and its contents are contributed largely by people in ICI. The articles are a happy combination of technical and general subjects, while colour printing does much to enhance the appearance of this very readable magazine.

CLIMAX MOLYBDENUM COMPANY OF EUROPE, LIMITED, 2, Cavendish Place, London, W.1—The author of "Tool Steels," a booklet just issued by the company, is Dr. B. L. Averbach, a recognized authority in the tool steel field and an associate professor at the Massachusetts Institute of Technology. The data includes the metallurgy, heat treatment, properties, and applications of tool, die, and high-speed steels.

VIRGINIA POLYTECHNIC INSTITUTE, Blacksburg, Virginia, USA—Articles of interest to mining engineers and metallurgists are contained in the Mineral Industries Journal, published quarterly by the Mineral Industries Departments, School of Engineering and Architecture. The contents of the March issue include an article by Mr. T. Carl Shelton, Jnr., assistant professor, Mining Engineering Department, on "Drainage of Firedamp from Coal Measures—a Brief Review."

CHAMBERLAIN INDUSTRIES, LIMITED, Staffa Works, Argall Avenue, Leyton, London, E.10—The company has issued descriptive leaflets and official test reports covering its 5-cylinder and 7-cylinder hydraulic motors. These units are particularly successful in mining applications and have a number of advantages over the orthodox electric motor and gearbox drive. In gassy mines, for example, the use of these motors saves an enormous air consumption and provides a higher safety factor. The motors allow a drastic reduction of plan area and eliminates a large area of unsupported roof.

VICTOR PRODUCTS (WALLSEND), LIMITED, Wallsend-on-Tyne—Much of the space in the Victor Magazine, a quarterly, is devoted to social news and features of a general character, but the June issue contains two articles which will be of interest to readers of IRON AND COAL. In his managerial review, Mr. R. W. Mann, the managing director, refers to trading difficulties of the past six months due to a recession of orders from the National Coal Board. His story of how the position is being met is an interesting one. No less interesting is the article by Mr. L. R. Mann, the company's chief engineer, on "Temperature Measurement."

LAPORTE INDUSTRIES, LIMITED, Hanover House, 14, Hanover Square, London, W.1—In conjunction with its annual report for the past financial year, the company has produced—"in the interests of better knowledge of the British chemical industry and its work"—a full colour book, "The Raw Materials of Progress." The book, of considerable interest and a worthy addition to any bookshelf, if only on account of its magnificent production, is assured of a substantial circulation, as it is being issued simultaneously to shareholders, to the group's major customers, and to the company's 4,000 employees.

Coalfield News

ONE OF THE MEMBERS of a four-man delegation representing Nottinghamshire miners which is to visit Czechoslovakia this year, is Mr. John W. Kerry, branch delegate of Langton Colliery for the past 15 years.

TILLEY SEAM at Garesfield Colliery (Co. Durham) is to be closed this month. It is the fourth seam to be closed at the colliery in recent months. Most of the 140 miners affected are being found work in neighbouring pits.

CLOSURE of an uneconomic seam at Parkhouse Colliery (Derbyshire) in August will mean that 70 men at the pit will become redundant. They will be transferred to Williamthorpe Colliery which is about three miles away.

BRETBY COLLIERY (Derbyshire) is to close at the end of the month because the coal seam is almost exhausted. Most of the 250 men employed there will be transferred to the New Stanhope Drift and a few will remain at Bretby on salvage work.

COAL SHIPMENTS from the port of Blyth (Northumberland) during May totalled 464,416 tons—an increase of 73,220 tons on May, 1959. In the first five months of the year, 2,525,154 tons were shipped, 300,000 tons more than last year. Foreign shipments increased from 95,885 tons to 295,437 tons.

AFTER YEARS of service in coal mines, a 19-year-old pit pony, "Ginger," has left Barrow Colliery, near Barnsley, where he has worked for the past five years, to start a new life as a pet with a new owner at Stock Doyle (Northants), to whom he has been given by the National Coal Board.

MORWOOD DRIFT MINE, near Bardon Mill (Northumberland) is to close tomorrow (Saturday). About 30 of the 188 men employed there will be retained for a few months on salvage work. Some have already transferred to Shilbottle Colliery, while others have been offered work in pits in north Staffordshire.

MINERS IN YORKSHIRE want national and Area officials of the National Union of Mineworkers to vacate office every five years, and new elections to fill the posts. Their resolution, to be submitted at the annual conference of the NUM this month at Llandudno, has been supported by about 128,000 Yorkshire miners.

PRODUCTION STOPPED last weekend at West Machan Colliery (Lanarkshire), a small pit operated by James Burns & Sons under licence from the National Coal Board, because the coal seams are almost worked out and because of difficulties imposed by restriction on output at privately owned mines. The pit was opened in 1923. The firm is to continue the retail side of its business.

MONMOUTHSHIRE was leading other areas in South Wales and had some of the best prospects of any Area in Britain, said Mr. Gwyn Phillips, industrial relations officer of the No. 6 Area of the South-West Divisional Coal Board, speaking in Pontypool last weekend. With £12,000,000 being invested in the Area's mining industry, he went on, Monmouthshire's coalmining results will probably stand second to none in the whole of Britain.

SHIPMENTS OF COAL AND COKE from the South Wales ports last week were 53,633 tons which was 2,581 tons above the previous week's total and 7,676 tons up on the corresponding period of 1959. Shipments from the various ports (with 1959 tonnages in parentheses) were as follow:— Newport, 1,300 (2,671) tons; Cardiff, 9,384 (8,600) tons; Penarth, 2,398 (3,749) tons; Barry, 11,845 (8,993) tons; Port Talbot, 1,104 (903) tons; Swansea, 27,602 (21,041) tons.

Undistributed Stocks Top 34,000,000 tons

UNDISTRIBUTED stocks of coal are now back to the position that they were in the first week in February at over 34,000,000 tons. In the corresponding week of last year there were 2,546,000 tons at collieries and open-cast sites. Some of this increase may be taken up by consumers whose stocks are nearly 2,000,000 tons down on last year at 12,957,000 tons.

There were 601,100 wage-earners on colliery books on June 18, against 662,100 on June 20, 1959, the numbers engaged at the coal face being 229,300 and 257,600 respectively. Total absenteeism (all workers) in the week ended June 18 was 13.62 per cent. compared with 13.90 per cent. in the week ended June 20, 1959. Output at the face was 3.953 tons and overall 1.400 in the week ended June 18, compared with 3.749 and 1,354 tons in the week ended June 20.

The following table gives (in tons) the output of saleable mined coal by division in the week ended June 25, and the tonnage lost through all causes (holidays, disputes, and go-slows)—

Division.	Week ended June 25, 1960.		Week ended June 27, 1959.
	Total output.	Tonnage lost.	Total output.
Scottish	360,600	3,300	329,100
Northern (N&C) ..	215,400	38,900	200,200
Durham	461,300	4,400	489,300
North-Eastern ..	785,700	46,300	816,400
North-Western ..	250,400	3,100	276,800
East Midlands ..	848,600	34,500	808,700
West Midlands ..	274,200	1,500	319,000
South-Western ..	398,000	8,800	432,900
South-Western ..	29,600	—	33,100
Great Britain—			
Deep-mined coal ..	3,623,800	140,800	3,705,500
Other deep-mined (including licensed mines) ..	42,600	—	54,200
Open-cast coal ..	157,100	—	235,700
TOTAL	3,823,500	140,800	3,995,400

Miners Pick New President

NEW president of the National Union of Mineworkers will, it is understood, be Mr. Sidney Ford, at present secretary of the Colliery Officials and Staffs Area of the NUM. The election result is to be announced this weekend.

Mr. Ford, who is 50, has never worked in a mine, and has been at the NUM headquarters for 35 years. A reputedly outspoken anti-Communist, his election comes, therefore, as somewhat of a reverse for Mr. Alex Moffat, the Communist vice-president of the Scottish area of the NUM, who was generally predicted to become the new president.

MORE THAN 25,000 people attended the Nottinghamshire miners' annual rally at Mansfield on Saturday. Nine-mile road race—a new event—was won by Mr. Ronan J. Rush of Rufford Colliery. Also from Rufford was 61-year-old Mr. I. Meredith who finished the course in just over two hours. Cup for the best band in the procession was won by Teversal Colliery Band with Bestwood Colliery Black Diamonds Band second, and Creswell Colliery Band third.

IRON AND STEEL TRADE

ONE repercussion of the second rise in the Bank rate may quite likely be the limitation of further accumulation of steel stocks and, in particular, the upward trend of stocks of iron and steel scrap. Before the further twist in the credit squeeze was announced it was confidently expected in official quarters that UK demand for steel would rise this year from 21,000,000 ingot tons to 26,000,000 tons. Now there could quite easily come a slackening in the expansion of demand.

Pig-iron

Expansion of iron and steel production is unequal. Steel faces a difficult problem in keeping pace with the demands of its customers, whereas the ironfoundries are well able to cope with all the requirements of the users of iron castings.

One consequence is the contraction of steel exports and the other the limitation of iron imports.

Ferro-alloys

Ferro-tungsten remains unchanged in price again this week, and the demand has quietened somewhat. Slight price increases affect the major grades of ferro-silicon and high carbon ferro-chrome as from today (Friday). Both the low and high carbon grades of ferro-chrome are in steady request and ferro-silicon is well supported. Silicon metal, however, is still of only slight interest. Calcium silicide is fairly active, and the demand for ferro-manganese and silico-manganese is at a good level.

There is a steady call on ferro-titanium, and ferro-niobium is active. Ferro-vanadium is receiving moderate support, and ferro-molybdenum is in fair demand.

Semi-finished Steel

It is believed that the next development report will be ready by the end of the year. Certainly the emphasis will be on the level of efficiency and economy of operation. Hitherto the general raising of capacity has been the principal aim, but the third development scheme is likely to show considerable variation.

By the end of the year the total expenditure on new plant approved by the Iron and Steel Board will have amounted to £200,000,000. This is considerably higher than in the two preceding years.

Finished Steel

In proportion to the big outlay on the new steel sheet mills, expenditure on plate mill capacity is steadily mounting. This in fact is the most arresting feature of the high pressure on the plate mills.

More output from the mills is urgently needed and it can only come from one source. There is a general overall demand for most types of steel products but steel plates are in the ascendant and there is also a big demand for special types of dropforgings.

BRITISH BUSINESSMEN visiting Russia were invited to submit trade proposals for up to 20 years ahead by Soviet first deputy Prime Minister, Mr. Alexei Kosygin. He told a British Institute of Directors' delegation that the Soviet Union had a high opinion of British equipment it had bought, and extensive trade between the two countries was sought. A meeting could be called at any level, he said, for the discussion of further trading possibilities between Britain and Russia.

Growth of Austrian Steel Industry

AUSTRIAN iron and steel industry is to undertake several development plans over the next two years. The State-run VOEST company is completing the rebuilding of one of its blast furnaces and the Schoeller-Bleckmann concern is soon to begin producing seamless steel tubes. In September it is expected that a new billet and ingot unit will be brought into operation by Felten & Guilleaume and by the end of the year test operation of a new wire plant at Donawitz will have started.

Plans for 1961 include a rolling unit for refined steel at Judenburg, a refined steel band unit at Kindberg, and by mid-year the second cold-rolling plant for VOEST should be operational. Other projects, for which no completion dates are given, include a new low-hearth furnace and a vacuum founding unit for steel de-gassing for the Böhler company, and an electro-furnace, a cold-strip plant, and other installations for Schoeller-Bleckmann.

Apart from these new major schemes, there has been considerable expansion encouraged no doubt by the latest figures released by the Government. These show that last year the country's steel industry booked orders for 900,000 metric tons of industrial rolled goods—one third more than in 1958.

British Exhibition in New York

REVIEWING the recent British Exhibition in New York, Lord Rootes, chairman of the Dollar Exports Councils, says the exhibition was an outstanding success. More than 30,000 buyers registered their names and over 10,000 made inquiries at the joint Dollar Exports Council and Federation of British Industries' stand alone.

In regard to industrial development in Britain, more than 100 inquiries for factory development were received. The firm of Anderston Clyde Engineers, Limited, makers of mobile hydraulic uplift ladders, of Glasgow, had received orders worth more than £400,000.

Success of the exhibition meant that Britain could improve her export trade to the dollar area, said Lord Rootes, who added that recent figures for trading between Britain and the US were "frightening." Exports from the UK to the US increased by 7.4 per cent. during June and those to Canada rose by 14.4 per cent., but America increased her exports to this country by 95.6 per cent. and Canada by 40 per cent.

MR. P. D. TOLHURST has resigned his directorship of the Cementation Company, Limited.

Head Wrightson Books More Orders

CURRENT year for Head Wrightson & Company, Limited, engineers and iron and steel founders, of Thornaby-on-Tees (Yorks), started with a steadily increasing order-book and, provided steel can be obtained, its various works should be fully employed, states the chairman, Sir John Wrightson. Since profit margins were lower for home and export than in the past, he continues, any increase in profits would be due to greater efficiency and a higher turnover.

The year ended January 31, 1960, was not an easy one for makers of heavy capital equipment, Sir John says, and had it not been for the considerable tonnage of plant and equipment executed in India at Durgapur and for the nuclear power station at Bradwell, the profit for the year would have been less. As it was group net profit fell from £874,654 to £803,758, after tax of £628,580 (£636,011). The dividend for the year is raised to 14 (13¼ equivalent) per cent.

Referring to nuclear power plant, Sir John sounded a word of warning on the cost of building such plant. "We are finding that the work being placed by the Central Electricity Generating Board is still not sufficient in volume to recover the rising cost of the specialist engineering staffs and the massive research effort necessary," he said.

UK Imports Rhodesian Steel

INABILITY of home producers to meet the heavy demand for steel is reflected in the news that the British Iron & Steel Corporation, Limited, has ordered 22,000 tons of steel billets from the Rhodesian Iron & Steel Company, Limited. This is the first time that Risco has sold steel in Britain and although, at the price of £36 per long ton, the British order will not be very profitable to the company, it is welcome at the present time when local demand does not equal the increased capacity of the Risco plant.

Annual output of steel products at Risco's Que Que (Southern Rhodesia) works is running at 60,000 tons a year. Two-thirds of the present £9,000,000 development plan has now been completed and the annual output capacity by the beginning of July, when two open-hearth furnaces will be operating, will be 110,000 tons of steel products.

Big Rise in Manufacturers' Stocks

STOCKS held by manufacturers increased by £121,000,000 in the first quarter of 1960, compared with only £68,000,000 in the last quarter of 1959, and £4,000,000 in the first quarter of 1959. Distributors' stocks in the first quarter of this year increased by £82,000,000, compared with only £26,000,000 a year previously.

Combined stocks of manufacturers and distributors were up by £203,000,000 in the first three months of this year, compared with the increase of only £149,000,000 for the whole of last year.

PRESIDENT of the Board of Trade, Mr. Reginald Maudling, opened the International Machine Tool Exhibition at Olympia, London, on Saturday of last week. Machines and equipment worth £8,000,000 are on view until Friday next

Iron-ore Imports

IMPORTS of iron ore and concentrates (except chrome iron ore and roasted iron pyrites) in May, and the totals for the first five months of this year and last, are shown in the table below.

From	Month ended May 31.	Five months ended May 31.	
	1960.	1959.	1960.
	Tons.	Tons.	Tons.
Sierra Leone	65,810	239,455	347,259
Canada	267,765	299,058	505,050
Other Commonwealth countries and Eire	4,162	8,131	16,216
Sweden	355,727	1,075,350	1,840,474
Norway	32,877	113,493	140,330
France	43,650	189,104	251,993
Portugal	19,408	86,916	144,995
Spain	87,427	222,983	357,764
Algeria	148,683	647,839	912,323
French West Africa	—	117,629	—
Tunisia	53,705	249,513	368,842
Morocco (excluding Tangier) ..	109,460	166,113	380,320
Liberia	65,423	138,911	241,802
Venezuela	149,834	569,121	709,560
Brazil	40,772	214,546	287,371
Other foreign countries	38,642	58,086	312,009
TOTAL	1,483,345	4,396,248	6,816,308

Aluminium Mill Housing Cast in Record Time

FIRST of two 180-ton housings for the new aluminium rolling mill, the largest of its type in western Europe, is to be installed next year in the Kitts Green works, Birmingham, of James Booth Aluminium, Limited. It has been cast in record time by the English Steel Castings Corporation, Limited, at its Grimesthorpe steelfoundry in Sheffield.

One of the largest mill housings ever made by English Steel, the order was placed in March, and the first housing was cast in May, only eight weeks after. The housing is being transported in August to the English Electric Company, Limited, Liverpool, for machining before being delivered and installed at the James Booth Aluminium plant in November.

Both castings will be on site in March next year. The total weight of steel used in them is 250 tons.

To Aid Machine-tool Research

PREPARATIONS for the establishment of a new research organization for the British machine-tool industry are now in their final stages, the president of the Machine Tool Trades Association, Mr. E. W. Field, announced last Friday. It is intended that firms should contribute money to the organization so that the industry as a whole may benefit and avoid duplication of research. Moreover it will provide a new pool of knowledge for firms making machine tools to customers' specifications.

Mr. Field said that the newly constituted machine-tool research association was hoping to use facilities in the Production Engineering Research Association establishment at Melton Mowbray, the National Engineering Laboratory at East Kilbride, in laboratories at Cambridge and Birmingham universities, and at the Manchester College of Technology.

Company News

£3,100,000 is Bid for Rivet Bolt and Nut

CASH offer of £3,100,000 is being made by Acton Bolt, Limited, London, N.W.10, a subsidiary of S. Pearson Industries, Limited, for the £1,031,250 capital of the Rivet Bolt & Nut Company, Limited, Glasgow. The offer is 60s. per £1 share subject to certain conditions. Net asset value at end-1959, taking book figures, was about 49s. per share. The board of Rivet Bolt & Nut Company is to recommend acceptance, and will accept for itself in respect of shares which it owns or controls.

The company has works at Glasgow, Coatbridge (Lanarkshire), Motherwell, and Gateshead. It also owns all the capital of A. P. Newall & Company, Limited, Glasgow, and Walker & Wilson, Limited, Hamilton, and controls Blake & Company, Limited, Atherton (Lancs)—all bolt and nut making concerns.

IMPERIAL CONTINENTAL GAS ASSOCIATION, LIMITED—The company's holding in James Stott & Company, Limited, has been sold to Glover & Main, Limited, for £970,830.

SCOTTISH MACHINE TOOL CORPORATION, LIMITED—Final dividend of 10 per cent. for the year ended March 31, 1960, makes a total of 13 (12) per cent. Group net profit fell from £84,122 to £73,171, after tax of £67,000 (£87,000).

CHARLES S. MADAN & COMPANY, LIMITED, engineers and non-ferrous metal founders, of Altrincham (Ches)—The share capital has been acquired by Adamant & Western Engineering Company, Limited, Luton (Beds), by the issue of 141,935 ordinary 5s. shares and £165,000 in cash.

PYROTENAX, LIMITED, electric cable manufacturers, of Hebburn (Co. Durham)—A final dividend of 25 per cent. makes 40 per cent. for the year to March 31, 1960, and is an increase of 6 per cent. on the previous year's total, which included a 4 per cent. bonus. Group trading profit rose from £740,276 to £808,133.

NEWALL ENGINEERING COMPANY, LIMITED, machine tool and measuring instrument makers, of Peterborough—It is proposed to issue 500,000 new 2s. Ordinary shares to holders on a one-for-four basis at a price to be determined, and negotiations are proceeding for privately placing £200,000 debentures.

DANIEL DONCASTER & SONS, LIMITED, dropforgers, etc., of Sheffield—Final dividend is raised by 2½ per cent. to 15 per cent. making, with the higher 7½ (5) per cent. interim, a total of 22½ per cent. for the year to March 31, 1960—an increase of 5 per cent. Net profit is up from £308,578 to £318,632, after tax of £367,827.

SMETHWICK DROP FORGINGS, LIMITED—Output for 1959-60 was in advance of anything previously achieved, reports Mr. R. Bennett, chairman. Profits for the year of £547,723, though £160,637 better than last year, were still £40,999 below the record for 1957-58, yet turnover for the year was some 10 per cent. greater.

HENRY SIMON (HOLDINGS), LIMITED—The offer to acquire the capital of T. & T. Vicars, Limited, manufacturers of biscuit making machinery and mechanical stokers, of Newton-le-Willows (Lancs), has been accepted by all the ordinary holders and over 90 per cent. of holders of preference shares. Mrs. H. M. Vicars is retaining her holding by special agreement. The board of Vicars is to be reconstructed by the appointment of three of the company's directors—Mr. C. H. Wooll, Mr. G. H. Sugden, and Mr. E. G. Liebert—and the reappointment of the three executive directors of Vicars in Mr. A. Appleton, Mr. T. A. Owen, and Dr. E. Potts. Mr. Wooll will become managing director.

LAPORTE INDUSTRIES, LIMITED—An offer has been made to acquire the ordinary and 5 per cent. cumulative preference shares of Peter Spence & Sons, Limited, makers of heavy chemicals and organic titanium compounds, of Widnes (Lancs). The total cash consideration amounts to about £2,500,000. The board of Spence & Sons has recommended acceptance.

RICHARDSON, WESTGARTH & COMPANY, LIMITED, marine, turbine, electrical, and general engineers, of Wallsend-on-Tyne—A further fall in profits would seem to be inevitable and in view of the immediate profit prospect a reduction in dividend for the current year must be regarded as likely, states the chairman, Mr. O. J. Philipson, in his annual review.

ASSOCIATED COAL & WHARF COMPANIES, LIMITED, London, E.C.3—Final dividend of 9 per cent. is recommended making 12 per cent. for the year ended 31st March, 1960—equivalent to a dividend of 20 per cent. on the capital before the scrip issue—against 18 per cent. last year. Net profit was £251,509 (£259,201), after taxation of £249,193 (£262,749).

CHUBB & SONS LOCK & SAFE COMPANY, LIMITED, London, W.1—Final dividend of 18 per cent. makes 24 per cent. for the year ended March 31, 1960, against the equivalent of 19.2 per cent. in 1958-59, when there were one-for-four rights and scrip issues between the interim and the final. Net profit was £256,822 (£209,864), after tax of £295,186 (£204,640).

PEGSON, LIMITED—The associated company, Bull & Son, Limited, structural steelworkers, is to be transferred from Melton Mowbray to Coalville (Leics). A new fabricating shop with an area of some 15,000 sq. ft. is to be added to the Coalville works since no further expansion can be undertaken at Melton Mowbray. Bull & Son was acquired four years ago.

THOMAS WRAGG & SONS (SHEFFIELD), LIMITED—Dealing on the Sheffield Stock Exchange in the whole of the issued share capital began last week. It is expected that for the year to March 31, 1961, profits will be about £180,000. If this is so dividends for the current year would total 15 per cent., less tax, of which 5 per cent. would be paid as an interim in December.

HARPER ENGINEERING & ELECTRONICS, LIMITED, aircraft engineers, of Exeter (Devon)—Accounts to June 30, 1960, are expected to show a trading profit of not less than £1,100,000. An interim dividend of 40 per cent. has already been declared payable on July 30, and the directors expect a total of at least 80 per cent., against a single payment of 30 per cent. last year.

CAMBRIDGE INSTRUMENT COMPANY, LIMITED—A share exchange offer worth about £600,000 has been made for the ordinary capital of Electronic Instruments, Limited, a private company, of Richmond (Surrey). The basis of the offer is seven Cambridge Instrument 5s. ordinary shares for every three of EIL's 185,000 £1 ordinary. The EIL directors recommend acceptance.

JOHNSON, MATTHEY & COMPANY, LIMITED, gold, silver, and platinum refiners, etc., of Birmingham—The ordinary dividend for 1959-60 is raised with a final payment of 9 per cent., making a total of 12 per cent., compared with the equivalent of 8 per cent. for 1958-59 allowing for the one-for-two scrip issue. Group net profits advanced to £960,130 (£828,282), after tax of £965,159 (£627,627).

SUNROD, LIMITED—The domestic boiler division has

been purchased by Midland Aluminium, Limited, which is to form a new company—Sunrod Domestic Boilers, Limited. The company is to change its name to Sunrod Industrial, Limited, and will continue to manufacture large industrial boilers. It will continue to be controlled by the Swedish boiler concern, AB Svenska Maskinverken, Stockholm.

SPARK HOLDINGS, LIMITED—Acquisition of Hawke Cable Glands, Limited, has been completed for £100,000 cash and 250,000 ordinary 1s. shares. Contracts have also been exchanged for the acquisition of J. T. Price & Company (Brass & Aluminium Founders), Limited, for £100,000 cash and 375,000 shares. The cash portion of the considerations is substantially being found out of the group's own liquid resources.

MOUNTSTUART DRY DOCKS, LIMITED—For the year ended March 31, 1960, a dividend of 5 per cent. and a 3 per cent. capital debenture on the reorganized capital is to be paid. During the year the preferred ordinary and deferred ordinary capitals were consolidated into one-class ordinary, holders of the former shares receiving a 60 per cent. scrip issue in ordinary and deferred ordinary holders, the equivalent of 100 per cent.

JOHN THOMPSON, LIMITED, combustion and general engineers, of Wolverhampton—Orders on hand at the end of 1959 amounted to £29,430,000 and by the end of March, 1960, had risen to £31,370,000, states the chairman, Sir Edward Thompson. Orders booked during the six months ended March, 1960, at nearly £20,000,000, were more than double those of the corresponding six months of a year earlier. Sir Edward states that the improvement in orders will not materially improve the current year's results.

FIRTH CLEVELAND, LIMITED—Final dividend of 17½ per cent. makes 27½ per cent. for 1959 against the 24 per cent. forecast in the July, 1959, share offer. There was no payment in the previous 14 months. Group net profits rose from £971,336 to £1,201,013, after tax of £928,825 (£872,409). Firth Cleveland-Laing, Limited, has been registered as a private company with an authorized capital of £25,000 in 4s. shares to acquire rights with a view to the exploitation of the inventions of Herr Nikolous Laing in the field of aerodynamics.

David Brown Regrouping

TRACTOR, agricultural machinery, and automobile divisions of the David Brown Corporation are to be separated from the gear, foundry, and tool operations of the company to facilitate further expansion at home and oversea, it is stated. A new company, David Brown Tractors, Limited, has been formed to take over the undertaking and net assets of the tractor division of David Brown Industries, Limited. This will become the parent company of the tractor group.

David Brown Industries will become the principal operating company of the gear, foundry and tool divisions. Sale of the group's products will continue to be made through the David Brown Corporation (Sales), Limited.

GEORGE ELLIOT & COMPANY, LIMITED—Mr. Walter W. Stanley has been appointed assistant managing director of the company's wire rope works at Cardiff. Mr. John Terrell, managing director of William Terrell & Sons, Limited, has joined the board.

Board Changes

New Posts on Ransomes & Rapier Board

CHANGES are announced in the board of Ransomes & Rapier, Limited, the Ipswich (Suffolk) ball and roller bearing subsidiary of Newton Chambers & Company, Limited. Col. R. P. W. Adeane has been appointed deputy chairman with Mr. K. E. Walker as vice-chairman. Rear-Admiral R. S. Warne now becomes the managing director of the company.

Mr. S. C. Tyrell has relinquished his duties as joint managing director but retains his seat on the board. Mr. Tyrell became a director of Ransomes & Rapier when that company was merged with Newton Chambers in 1958. He joined Newton Chambers in 1940 and was made a director in 1956 after a period as chief accountant.

WILLIAM CORY & SON, LIMITED—Mr. H. E. C. Mellonie has retired from the board.

W. & T. AVERY, LIMITED—Mr. R. C. Hale has joined the board and been appointed commercial manager.

BIRMINGHAM SMALL ARMS COMPANY, LIMITED—Mr. S. A. Roberts, managing director of the subsidiary, BSA Tools, Limited, has joined the board.

H. J. ENTHOVEN & SONS, LIMITED—Mr. M. de Boissieu, Secretaire Générale de la Société Minière et Métallurgique de Penarroya, has resigned from the board.

BIFURCATED & TUBULAR RIVET COMPANY, LIMITED—Mr. J. M. A. Paterson has been appointed chairman and managing director following the retirement of Mr. L. M. Paterson.

HARLAND & WOLFF, LIMITED—Mr. J. A. Watt, Belfast shipyard manager, and Mr. R. R. G. Cameron, naval architect, have joined the board. Mr. H. R. Humphreys and Mr. W. H. Park have resigned as directors.

GUY MOTORS, LIMITED—Mr. A. L. Blower has resigned as chairman and director because of the pressure of the other commitments. He is succeeded by Mr. Arthur Chamberlain who joined the board last year. Mr. Blower is also a director of J. Brockhouse & Company, Limited, and a member of the British Transport Commission, and was formerly on the board of Tube Investments, Limited, and managing director of the Hercules Cycle & Motor Company, Limited.

METROPOLITAN-CAMMELL CARRIAGE & WAGON COMPANY, LIMITED—Mr. C. G. Wallace has retired as director and joint secretary of the company and as director and secretary of Metropolitan-Cammell-Weyman, Limited, and of G. H. Sheffield & Company (Engineers), Limited and secretary of Metropolitan-Railcars, Limited. Mr. W. Scott, director and joint secretary of the company now becomes secretary of the company, and director and secretary of the other three companies.

MOND NICKEL COMPANY, LIMITED—Mr. G Archer has been appointed president of the company and of the subsidiary, Henry Wiggin & Company, Limited. He has relinquished his chairmanship of both companies. Mr. Ivon A. Bailey has been appointed chairman and chief officer of both companies. Dr. L. B. Pfeil has been appointed vice-chairman and Mr. J. O. Hitchcock managing director of Mond Nickel and Mr. Hitchcock becomes deputy chairman of Henry Wiggin, with Mr. H. W. G. Hignett as managing director.

NEWS IN BRIEF

CENTENARY OF the Fairfield Shipbuilding & Engineering Company. Limited, Glasgow, was celebrated yesterday (Thursday).

SIXTEEN new representatives have been added to the technical sales force of the Nuralite Company, Limited, one of the British Uralite group of companies.

ELECTRIC ARC FURNACE, with a fabric gas cleaning plant, is to be installed at the Stockton-on-Tees steelfoundry of Head Wrightson & Company, Limited, to replace the existing cupolas and converters.

NEW DEPOT at Silverdale Road, Hayes (Middx) (telephone: HAYes 8241) of British Insulated Callender's Cables, Limited, is to be opened on Monday. Mr. T. W. Hills, formerly sales representative at the London branch, will be in charge.

AS FROM TODAY (Friday) the Office Management Association has changed its title to the Institute of Office Management. The change of name preludes a reorganization of the institute and a programme to improve office efficiency in the UK.

APPLICATIONS concerning agreements between the members of the Association of Steel Drum Manufacturers and between members of the Association of Hard Fibre Rope Manufacturers are to come before the Restrictive Practices Court on Monday.

OFFER OF A COMPLETE iron and steel works with an annual capacity of some 150,000 metric tons has been made to Brazil by the Polish Government. The plant would be paid for over a period of eight years in goods and not cash. Brazil is to examine the offer.

ITALIAN STEEL producers Siderurgica Sarda and Fenotti have reported altered prices for ferro-concrete round steel to the High Authority of the European Coal and Steel Community. They are, respectively, a decrease of 1.4 per cent. and an increase of 3 per cent.

IN PREPARATION for a sharp rise in the demand for aluminium sheet products, predicted by its marketing experts, the Aluminum Company of America is to expand and modernize its major sheet mills at Davenport, Iowa, and Alcoa, Tennessee, at a cost in excess of $18,000,000.

LONG SERVICE presentations were made to 25 employees of Davey & United Engineering Company. Limited, manufacturers of engineers' plant, etc., of Sheffield, on Monday. Longest serving member was Mr. G. R. Harrison (70) who has been with the company for 56 years.

FOLLOWING a four-weeks' tour of Canada, during which he secured orders for rope attachments made chiefly for work in coal mines, Mr. Arthur W. Phillips, a director of "Reliance" Rope Attachment Company, Limited, Cardiff, has undertaken a nine-days' sales tour of North America.

THE VICE-CHANCELLOR of Southampton University has announced a gift of £50,000 by the Esso Petroleum Company, Limited. This follows a number of other donations to education by the company, which also finances up to 15 post graduate studentships for research in chemical engineering or chemistry.

LARGE two-bay factory and office block, on land adjoining Seisdon Rural Council's industrial estate, has been acquired by Midland Aluminium, Limited, Wolverhampton. The company's present premises are in an area scheduled for residential purposes and it hopes to move to the new site by the end of the year.

WORKS SAVINGS GROUP at Swift Bros. (Rolling Mill), Limited, Owlerton Bridge, Sheffield, has won the trophy awarded annually by Sheffield Savings Committee on the basis of the amount saved in relation to the strength of the group. The winning group has 148 members—all but eight of the total number of employees at the works.

FEARS THAT Bankfoot Coke Works may be closed are to be discussed by a deputation from Crook and Willington Urban Council (Co. Durham) to the Durham Divisional Coal Board. The council was told that men had been moved to other works and there were fears of redundancy, although the board had recently applied for a new tipping site.

MORE THAN 200 apprentices from the Rugby works of the English Electric Company, Limited, received indentures and merit awards on Saturday. Derrick E. Palmer won the Foreman's shield for the best craft apprentice of the year and Stephen A. Gaydon was the best student of the year. Ian Wallace McKenzie, of the steam turbine research department, was the best graduate apprentice of the year.

SALE OF DIESEL ENGINES manufactured by F. Perkins, Limited, Peterborough, throughout America and Canada is to be handled by the Chrysler Corporation's marine and industrial division, Detroit. A recently formed Perkins subsidiary in Detroit called the Perkins Engine Company, Inc., will be responsible for the development of the American market and for liaison with US manufacturers using Perkins products.

COAL, COKE, AND PATENT FUEL shipments from Grimsby during the four weeks ended May 22, amounted to 21,577 tons—a drop of 5,882 tons on the corresponding period of last year. During the same four weeks 53,376 tons of iron ore and pyrites were imported through Immingham docks. The bulk of the export trade through the ports was accounted for by coal, coke, and patent fuels which totalled 113,077 tons.

CZECHOSLOVAKIA is building 11 new rolling units with a combined capacity of over 3,000,000 metric tons a year. They will be brought into operation during the year and will expand the output of the New Klement Gottwald steelworks, in Kuncice, the Trinec ironworks and the Associated Steelworks, at Kladno. The country is also bringing four coke batteries, two blast furnaces, and seven other furnaces into operation for the steel industry.

HOME AND OVERSEA orders are being received at the rate of one a month (£200,000 a year) for the X-ray scanning microanalyser developed by Tube Investments, Limited, in collaboration with the Cavendish Laboratory, Cambridge, and now being made and marketed by the Cambridge Instrument Company, Limited. The instrument provides metallurgical analysis of a sample by irradiating and scanning it with a fine beam of electrons, and analysing the resulting emission of X-rays.

EXCHANGE VISIT between Russian and British refractories technologists began in Sheffield last week when a party of six Russians visited the department of refractories technology at the University, guided by Prof. J. White, past president of the Refractories Association of Great Britain and three other association members, Mr. R. Clark, Mr. Graham Price, and Mr. J. E. Roberts. The Russians also visited the firebrick works of J. J. Dyson. Limited, Stannington, the silica brick works of Pickford, Holland & Company, Limited, Millhouses, and the basic brick works of General Refractories, Limited, at Worksop.

Imports and Exports of Iron and Steel

FIGURES of imports and exports of iron and steel in May are given in the following tables, based on Board of Trade returns, and including totals for the first five months of 1959 and 1960.

Total Exports of Iron and Steel

Destination.	Month ended May 31.	Five months ended May 31.	
	1960.	1959.	1960.
	Tons.	Tons.	Tons.
Cyprus	169	735	749
Sierra Leone	169	2,875	2,048
Ghana	519	13,395	8,318
Nigeria	2,593	31,436	25,235
Union of South Africa	5,566	20,750	30,646
Rhodesia and Nyasaland	2,090	9,078	9,240
Tanganyika	2,054	8,108	5,005
Kenya	4,128	10,087	11,301
Uganda	62	2,626	610
Mauritius	442	584	1,867
Aden	306	1,195	943
Bahrein, Qatar, and Trucial States	1,478	3,554	7,556
Kuwait	1,143	6,113	3,121
India	12,522	76,147	102,439
Pakistan	4,505	14,540	30,122
Singapore	2,488	9,894	8,111
Malaya	1,582	5,077	8,297
Ceylon	9,148	21,434	26,042
British North Borneo	701	1,318	2,178
Hongkong	6,388	28,995	29,349
Australia	14,816	37,531	71,608
New Zealand	10,196	38,715	41,761
Canada	28,438	62,266	106,734
Jamaica	1,742	8,323	11,152
Trinidad	2,787	17,060	19,493
British Guiana	1,043	2,687	3,735
Other Commonwealth countries	3,024	17,272	16,485
Eire	5,902	19,589	26,464
Soviet Union	3,842	1,381	13,458
Finland	3,876	12,590	18,601
Sweden	14,663	51,432	86,814
Norway	11,339	39,291	56,349
Denmark	8,687	39,289	45,192
Western Germany	9,249	49,231	70,465
Netherlands	9,369	34,688	56,235
Belgium	4,206	12,915	16,743
France	274	993	2,979
Switzerland	1,199	3,336	5,458
Portugal	1,434	7,180	6,723
Spain	4,761	11,443	20,475
Italy	4,284	23,463	19,091
Austria	455	1,362	2,255
Yugoslavia	4,305	1,618	20,673
Greece	1,180	5,139	7,494
Turkey	3,402	2,266	5,048
Netherlands Antilles	319	1,453	2,094
Portuguese East Africa	217	633	1,774
Egypt	172	1,200	6,464
Sudan	639	4,149	4,699
Lebanon	117	160	593
Israel	1,401	4,405	9,206
Saudi Arabia	17	2,435	196
Iraq	1,819	45,910	10,485
Iran	3,957	12,179	31,604
Burma	899	3,133	3,848
Thailand	272	3,740	3,046
Indonesia	2,518	2,416	14,179
China	4,907	24,479	26,046
Japan	4,878	37,660	35,100
Philippine Republic	327	1,825	4,534
USA	28,002	54,528	132,248
Cuba	1,235	3,289	5,121
Colombia	377	980	3,643
Venezuela	2,900	35,639	21,239
Ecuador	621	482	1,519
Peru	675	1,243	3,198
Chile	370	698	1,274
Brazil	1,280	7,056	8,460
Uruguay	1,252	664	4,670
Argentina	5,230	82,790	43,524
Other foreign countries	7,091	21,871	53,983
TOTAL	284,018	1,124,018	1,497,409

Total Imports of Iron and Steel

From	Month ended May 31.	Five months ended May 31.	
	1960.	1959.	1960.
	Tons.	Tons.	Tons.
Union of South Africa	1,343	9,294	16,050
Rhodesia and Nyasaland	459	2,108	3,028
Canada	16,658	5,677	27,872
Other Commonwealth countries and Eire	930	4,018	11,475
Soviet Union	496	13,986	14,027
Sweden	4,574	10,575	20,026
Norway	16,056	32,493	62,628
Poland	454	2,428	7,563
Western Germany	11,548	22,664	68,380
Netherlands	24,513	71,028	92,894
Belgium	14,599	11,833	49,758
Luxembourg	1,794	3,371	6,756
France	5,093	8,643	29,256
Italy	5,413	1,687	13,734
Austria	996	1,138	5,479
Japan	369	1,063	3,137
USA	34,978	13,254	88,766
Other foreign countries	21,659	5,033	30,410
TOTAL	161,932	220,293	551,539
Iron and steel scrap and waste, fit only for the recovery of metal	10,297	1,800	66,484

Exports of Iron and Steel, by Product

Product.	Month ended May 31.	Five months ended May 31.	
	1960.	1959.	1960.
	Tons.	Tons.	Tons.
Pig-iron	9,673	55,822	83,953
Ferro-columbium (niobium)	3	22	60
Ferro-tungsten	61	542	467
Other ferro-alloys	1,905	1,718	5,241
Ingots, blooms, billets, slabs, sheet bars (incl. tinplate bars), and similar primary forms	372	27,900	19,571
Pieces roughly shaped by forging	107	738	741
Iron bars, rods, angles, shapes, and sections	90	526	642
Steel bars, rods, angles, sections, and shapes	57,281	136,130	274,553
Iron plates and sheets	104	173	409
Universal plates	1,700	3,126	9,497
Steel plate, 3mm. and under 4 5mm. thickness	2,529	20,061	16,540
Ditto, 4.5mm. or more in thickness	29,720	62,943	149,495
Blacksheets and blackplate	24,399	110,502	132,522
Hoop and strip	7,932	31,161	41,770
Tinplate	40,021	192,361	239,574
Decorated tinplate	413	3,980	2,024
Galvanized sheets	8,871	39,236	47,295
Other (incl. tinned sheets, terneplate, and ternesheets)	3,149	7,278	13,469
Railway and tramway construction material	16,956	72,519	58,824
Wire rods of steel (incl. alloy steel)	4,725	20,075	26,038
Wire	12,153	43,520	55,135
Tubes, pipes, and fittings	65,003	293,685	333,118
TOTAL	284,018	1,124,018	1,497,409

PROGRESSIVE IMPROVEMENT in shipping activities on the River Tees had resulted from the end of the recession in the iron and steel industry, said Ald. Alec Ross at a meeting of the Tees Conservancy Commission. Tonnage through the river in May was 85.774 tons more than in May of last year. Imports in April increased by 140.000 tons to 411.566 tons, due mainly to increased imports of iron ore, while exports, at 153.029 tons, were 50,000 tons up due to bigger shipments of finished steel products, chemicals, and fertilizers.

Let ATLAS COPCO take the load

... in mining and contracting

T2GH Auto-Loader

Air-powered Loaders and Dumpers for every underground requirement

Headroom, track gauge, car size, clean-up range ... you take all these into consideration before you buy loaders! That's why you should know about the Atlas Copco range. This includes loaders and dumpers to meet every requirement in underground work and to handle all kinds of muck—abrasive, sticky or free-running—with equal efficiency.

Auto-Loaders

T2G and T2GH auto-loaders allow one man to carry out the complete mucking operation—loading, transporting and dumping. As a result, labour costs are considerably reduced. Fitted with pneumatic tyres, these highly manœuvrable loaders put up excellent performances in both confined spaces and wide areas. Maintenance costs are lower as the rubber tyres help to reduce stress on the loaders. The T2G dumps directly into chutes or ore pockets, whilst the T2GH has a greater dumping height allowing it to discharge directly on to conveyors.

LM Loaders (rail-mounted)

Loaders in the LM series have bucket capacities ranging from 4 to 21 cubic feet and clean-up ranges from 6′ to 12′ 5″ (1.8 to 3.8 m.) without side-ploughs. The medium-sized model of this series is the LM56. Fitted with pneumatic side-swinging and quick-action controls, this machine is designed to reduce operator fatigue and increase loading capacity. In fact, with a bucket capacity of 7 cubic feet and a clean-up range of 8′ 8″ (2.7m³), it has a loading capacity in excess of any other loader of comparable size!

WRITE FOR LITERATURE—Further information about Atlas Copco loaders and dumpers is given in a series of leaflets and folders—readily available on request. Write for copies to your local Atlas Copco company or agent or to the address below.

Sales and service in ninety countries

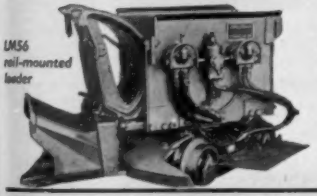
With companies or agents in ninety countries, Atlas Copco is the world's largest organisation specialising solely in compressed air equipment. Products include stationary and portable compressors rock drills, loaders, hoists, paint-spraying equipment and air tools of every description. Wherever you are, the international Atlas Copco group offers expert advice on the selection of equipment and provides a complete after-sales service.

Atlas Copco

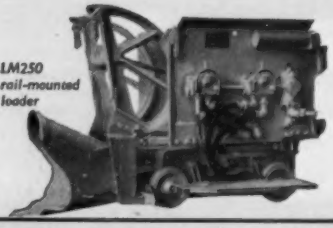
COMPRESSED AIR ENGINEERS

ATLAS COPCO (GREAT BRITAIN) LIMITED

Maylands Avenue, Hemel Hempstead, Herts.
Telephone: Boxmoor 6040



LM56 rail-mounted loader



LM250 rail-mounted loader

T2G Auto-loader

Sales and Service Depots at: LONDON · BRISTOL · CARDIFF · MANCHESTER · NEWCASTLE · WALSALL · LEEDS · GLASGOW · BELFAST · DUBLIN

D170

Exports of British Coal

DETAILS of British coal exports and bunker coal shipments in May, and the totals for the first five months of this year and last, are given below.

From	Month ended May 31.	Five months ended May 31.	
	1960.	1959.	1960.
Categories	Tons.	Tons.	Tons.
Anthracite—			
Large	8,231	17,575	30,800
Graded	28,009	93,749	96,107
Cleaned smalls	22,517	45,355	94,242
All other	23,077	150,265	120,300
Steam coal (including household)—			
Unscreened	471	17,329	10,021
Large	37,439	84,963	301,333
Graded	14,072	113,298	182,270
Cleaned smalls	160,476	113,582	490,021
Untreated smalls	109,342	315,368	453,006
Other	2,143	103,901	72,435
Gas coal—			
Unscreened	21,747	60,709	100,880
Large	564	1,966	11,210
Graded	34,613	109,912	176,816
All other	1	5,533	11,859
Coking coal—			
Cleaned smalls	8,194	19,344	20,022
Other	7,545	45,641	43,773
TOTAL	478,441	1,298,490	2,215,095
Destinations.			
Canada	9,031	22,130	20,846
Other Commonwealth countries	929	8,420	13,716
Eire	90,055	313,453	538,249
Finland	—	3,595	14,580
Sweden	9,297	57,063	76,228
Norway	8,286	38,091	48,655
Denmark	198,577	327,736	686,363
Western Germany	34,088	100,024	183,565
Netherlands	71,909	148,014	345,737
Belgium	13,061	124,299	65,951
France	13,419	106,968	75,537
Portugal	19,382	10,234	70,240
Italy	8,850	7,575	51,834
Argentina	—	15,737	7
Other foreign countries	1,557	15,151	23,587
Fuel taken on board vessels engaged in the foreign trade (including fishing vessels) for their own use—			
British flag	36,374	258,447	180,846
Other flags	2,126	19,443	17,300

Exports of Coke and Patent Fuel

THE following table gives figures of exports of coke and manufactured fuel from the United Kingdom during May, and the totals for the first five months of this year and last.

Products.	Month ended May 31.	Five months ended May 31.	
	1960.	1959.	1960.
	Tons.	Tons.	Tons.
Gas coke	43,190	258,175	242,851
Hard coke	42,056	99,932	194,406
Breeze	36,530	188,141	167,342
Manufactured fuel	6,377	57,546	51,783
TOTAL	128,153	603,794	656,382

Imports and Exports of Mining Machinery

ACCORDING to Board of Trade returns, mining machinery (other than portable power tools) valued at £83,118 was imported during May, compared with £118,794 in May, 1959. Imports in the first five months of this year were valued at £439,550 against £548,720 in the corresponding period of last year.

The appended table contains figures of export values of mining and well-drilling machinery in May, and values for the first five months of this year and last.

Destination.	Month ended May 31.	Five months ended May 31.	
	1960.	1959.	1960.
	£	£	£
Union of South Africa	17,266	237,432	257,638
Rhodesia and Nyasaland	1,631	91,957	17,578
India	90,467	712,700	524,645
Australia	52,475	126,092	181,833
Canada	22,083	94,187	172,952
Trinidad	28,855	143,648	188,297
Other Commonwealth countries and Eire	57,350	557,133	568,970
Netherlands	36,368	123,078	88,284
France	6,944	70,946	77,049
Venezuela	3,641	106,569	50,934
Other foreign countries	177,213	1,460,977	1,254,120
TOTALS.			
Well-drilling machinery—			
Petroleum	184,693	1,529,832	1,216,912
Other	45,823	108,840	169,906
Mining machinery (excluding portable power tools)—			
Coal-cutters, power-operated—			
Complete	31,972	261,471	208,402
Parts	47,517	282,687	364,833
Conveyors, underground—			
Complete and parts	64,248	478,422	538,935
Winders, power operated—			
Complete	—	82,907	111,292
Parts	18,849	131,594	96,927
All other	101,191	848,966	675,093
TOTAL	494,293	3,724,719	3,382,300

Amendment to EFTA (Origin of Goods) Regulations

THE European Free Trade Association (Origin of Goods) (Amendment) Regulations, 1960, published last Friday (SI 1960, No. 1043), make certain minor additions and amendments to the European Free Trade Association (Origin of Goods) Regulations, 1960 (SI 1960, No. 780). published on May 3, 1960.

These additions and amendments arise in the main from decisions taken by member countries of the EFTA after the regulations published on May 3 were sent to print.

TIMNA COPPER WORKS, Israel, exported its entire output of 5,400 tons of copper cement in the 1959-60 fiscal year, states Barclays Bank DCO. Indications of mineral primary copper recently discovered in the vicinity of Timna and a new appraisal of the known ore deposits there have led experts to double their estimates of the field's production potential. Earlier proven deposits were estimated at some 17,000,000 to 18,000,000 tons of ore of an average copper content of 1.4 per cent.

R W G

This is the lower half of a gas turbine cylinder for a 2,500 kW gas turbo-alternator now running in a Midland steel works, converting the heat in waste blast-furnace gas into useful work. The provision of economical power is our business; and since we manufacture most of the main equipment for a power station such as boilers, turbines, alternators, condensers, feed heaters, cooling-water strainers, we are well equipped to design and carry through schemes for the efficient utilisation of any fuel.

THE RICHARDSONS WESTGARTH GROUP

Co-ordinating the activities of

THE NORTH EASTERN MARINE ENGINEERING CO. LTD. — RICHARDSONS WESTGARTH (HARTLEPOOL) LTD.
PARSONS MARINE TURBINE CO. LTD. — THE HUMBER GRAVING DOCK & ENGINEERING CO. LTD.
GEORGE CLARK (SUNDERLAND) LTD. — RICHARDSONS WESTGARTH ATOMIC LTD.
RICHARDSONS WESTGARTH, INC.

ASSOCIATED COMPANY: ATOMIC POWER-CONSTRUCTIONS LTD.

RICHARDSONS, WESTGARTH & CO. LTD., WALLSEND, NORTHUMBERLAND,
and at 58 Victoria Street, London, S.W.1, 59 Mosley Street, Manchester and 75 Buchanan Street, Glasgow. RW.21

CURRENT PRICES OF IRON AND STEEL

(Delivered, unless otherwise stated)
June 30, 1960

PIG-IRON

Foundry and Forge Iron.—No. 3 iron, Class 2, Middlesbrough, £21 6s.; Birmingham, £20 18s. 3d., 10-ton lots or over.

Low-phosphorus Iron.—Over 0·10% to 0·40% P, 10-ton lots or over, £23 5s., delivered Birmingham, £23 10s., delivered Grangemouth.

Basic Pig-iron.—Delivered in Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leics, 10-ton lots or over, £20 3s.

Hematite.—Si up to 2%, S & P 0·03-0·05%: N.-E. (local iron), £23 19s.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 7s. 6d.; Birmingham, £25 14s.; Wales (Welsh iron), £23 19s., 10-ton lots or over in each case.

Refined.—Cylinder and refined irons, South Zone £25 9s., North Zone £25 6s. 6d. Refined malleable, max. 0·10% P. South Zone £26 9s., North Zone £26 6s. 6d.

MANUFACTURED IRON

(Bar basis, 2½ in. to ¾ in.)

CROWN IRON: England and Wales (Zone 1), £48 10s.; Scotland, £48 5s.; Ireland, f.o.q. Belfast, £50 7s. 6d.; all other Northern Ireland ports, £50 10s., f.o.q. Cable iron, £1 extra.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft, u.t., 100 tons and over, £31 15s. 6d.; tested, 0·08-0·33% C, 6 to 35 tons, £33 15s. 6d.; hard (0·41-0·60% C), under 10 tons, £34 17s.; silico-manganese, under 10 tons, £43 16s. 6d.; free-cutting steel up to 0·25% C, under 10 tons, £36 14s. 6d. SIEMENS-MARTIN ACID (under 10 tons): Up to 0·25% C, £41 1s.; silico-manganese, £44 4s.

Billets, Blooms, and Slabs for Forging and Stamping.—Lots of under 10 tons. Basic, soft, up to 0·33% C, £38 10s.; basic, hard, over 0·41 up to 0·60% C, £39 12s. 6d.; acid, up to 0·25% C, £43 4s.; acid silico-manganese, £46 7s.

Alloy Steel (5 tons to under 10 tons).—BILLETS, 3 in., up to and including 10 in., for re-rolling, 0·6/1% Ni, £47.; Ni 2·75/3·75%, Cr 0·5/1·10%, £73 17s.; Ni 2·75/3·75%, Cr 0·5/1·3%, Mo 0·2/0·65%, £84 7s. BARS: 1 in. dia. and up, nickel, £67 17s.; nickel-chrome, £93 11s.; nickel-chrome-molybdenum, £111 4s.

Other Semi-products, etc.—Forging ingots, up to 0·60% C, £31 12s. 6d. f.o.t.; tube billets, under 10 tons, £40 10s.; shell steel billets for direct forging up to and including 0·33% C, 100 tons and over, £37 15s.; tin bars and sheet bars, 50 tons and over, £32 10s. Wire rods, 3g. to 4g. (all areas except Birmingham, Scotland, Southern Joint Area, and Northern Ireland): Soft basic, under 50 tons, £41 2s.; hard basic, under 10 tons, £44 8s.; free-cutting, up to 0·25% C, under 10 tons, £46 12s.; acid, up to 0·75% C, under 10 tons, £54 14s. 6d. Stainless steel billets, 3 in. and over, 5 tons to under 10 tons, Austenitic, £229 10s.; martensitic, £141 10s.

FINISHED STEEL

Heavy Products (1 ton to under 10 tons).—Mild-steel plates, ordinary qualities, N.-E. Coast and Northern Joint Areas and Central Scotland, £41 12s.; medium plates, all areas of England and Wales, £45 1s. 6d.; boiler plates, N.-E. Coast and Northern Joint Areas and Central Scotland, £44 2s.; floor plates, N.-E. Coast, £43 1s. Sections (N.-E. Coast, Midland, and Northern Joint Areas, and Central Scotland): Angles, £38 16s. 6d.; bars (rounds and squares), £41 6s. 6d.; flats, £39 1s. 6d.; joists, £38 12s. 6d.

Rolled and Re-rolled Steel Products.—N.-E. Coast, Midland, Northern Joint, and South Wales Areas, and Central Scotland, 50 tons and over: Angles and tees, 4 un. in. and under, £40 18s. Channels, 3-in. web and under, £40 18s. Flats, 5 in. wide and under, and rounds and squares, under 3 in.: Untested soft basic, £39 1s.; free-cutting, £45 1s. 6d.; hard basic, £41 19s. 6d.; Siemens-Martin acid, £49 0s. 6d.; spring steel, basic, £44 4s. 6d., spring steel, acid, £52 19s. Glazing tees, £47 0s. 6d. Sash and casement sections, £43 13s. 6d. Gate channels, £50 17s. 6d. Ferro-concrete bars (10 tons to under 500 tons), £39 10s.

Sheets and Strip.—Uncoated strip mill coils, hot rolled, under 3 mm. to 12g., mill run, mill edge, 25 tons to under 50 tons, £43 16s.; cold reduced, 17/20g., side trimmed, skin passed, £49 16s. Black sheets, 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £68 5s. Cold-rolled steel strip, coils, hard temper, not annealed, 10 tons to under 20 tons, £55 5s. Hot-rolled hoop and strip, u/t soft basic, 100 tons and over, £38.

Tinplates.—Cold reduced, hot dipped, 15 tons to under 50 tons, 66s. 8d. per basis box of 108 lb., f.o.t. makers' works. Cold reduced electrolytic, 59s. 9d. per basis box.

Colliery Rails and Arches.—Arches, 4 in. × 2½ in. × 2 in., re-rolled £39 15s., 3 in. × 3 in., re-rolled £40, 3½ in. × 3½ in., re-rolled £40 7s. 6d., 4 in. × 2½ in. × 2 in., prime £44 6s. 9d. Other sections, prime £44 11s. 9d. Extra fishplates, £52 10s. Cambered girders, 4 in. × 2½ in. × 2 in., re-rolled £38 9s., 3 in. × 3 in., re-rolled £38 11s. 6d., 3½ in. × 3½ in., re-rolled £38 18s. 6d., 4 in. × 2½ in. × 2 in., prime £43 4s. Other sections, prime £43 6s. 6d. Benk bars, standard type, prime material, all thicknesses, £38 11s.; re-rolled, up to ¾ in., inclusive, £37 6s.; over ¾ in., £38 11s. "W" type bars, prime steel, all thicknesses, £41 1s.; re-rolled, up to ¾ in., inclusive, £39 16s.; over ¾ in., £41 1s.

Bright Steel (10 tons to under 20 tons).—Bars, no analysis or test, £52 8s. 6d.; flats, untested, £70 3s. 6d.

High-speed Tool Steel.—Finished bars, 5% cobalt, 10s. 10d.; 14% tungsten, 6s. 11d.; 18% tungsten, 7s. 9d.; 22% tungsten, 9s. 2d.; 4/6 quality molybdenum tungsten, 6s. 3d.; 6/6 quality molybdenum tungsten, 6s. 5d.; 5/6/2 quality molybdenum tungsten vanadium, 6s. 7d. per lb.

Rails, etc.—F.B. rails, heavy, 75 lb. to under 90 lb., 500 tons and over, f.o.t., £39 15s.; fishplates for rails 80 lb. and over, 50 tons and over, f.o.t., £53 11s.; soleplates, f.o.t., 100 tons and over, £51. Light flange rails, 25 lb. and under, d/d N.-E. Coast, Midland, Northern Joint, and South Wales Areas, and Central Scotland, 50 tons and over, £40 17s. 6d.; fishplates for light rails, 50 tons and over, £50 12s. 6d.

BLAST-FURNACE COKE

(F.O.T. at Ovens)

DURHAM AND NORTH-EAST COAST: 159s. 3d. SOUTH WALES: 158s. NOTTS AND DERBY: 135s. 5d. LANCASHIRE: 146s. STAFFORDSHIRE: 139s. 5d. YORKSHIRE: 138s. 8d. SCOTLAND: 169s. 4d.

(All prices are subject to quality differentials.)

STEELWORKS SCRAP

(Plus 5 per cent. in the case of sales by merchants.)

	Scotland.	N.-E. Coast.	Midlands.	Sheffield.	Lancs.	S. Wales (East)	S. Wales (West)
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Heavy steel scrap* ..	229 3	228 3	220 0	226 3	225 3	227 3	232 3
Heavy mixed scrap*	207 3	206 3	198 6	204 3	203 9	205 3	210 3
Heavy steel turnings†	179 9	179 9	169 9	176 9	174 3	177 0	180 0
Heavy cast iron†	206 9	203 9	208 0	204 3	189 3	199 3	205 9
Cast-iron borings†	160 3	157 3	157 0	159 9	157 3	159 6	164 6

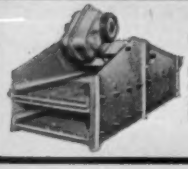
* Basis 500-ton lots in England and Wales and 250 tons and upwards in Scotland, delivered.
† Not less than 250 tons in England and Wales, 100 tons in Scotland.

You can't afford to be without

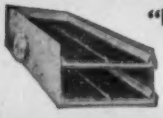
ALLIS-CHALMERS

Quality-built VIBRATING Screens

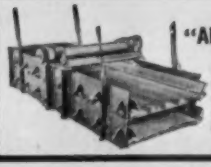
They're engineered to endure!



"LOW HEAD"
Horizontal or part inclined for installations with limited headroom.



"RIPL-FLO"
Ruggedly built inclined screen for normal or extra heavy duties.



"AERO-VIBE"
Light duty, inexpensive screen for specialised applications.

ALLIS-CHALMERS

ALLIS-CHALMERS · GREAT BRITAIN LIMITED
DEPT. I.R. · 728 SALISBURY HOUSE · LONDON WALL · LONDON · E.C.2.

CPH/9A CS/4

CLASSIFIED ADVERTISEMENTS

PREPAID RATES: Fifteen words for 7/6 (minimum charge) and 4d. per word thereafter. Box Number 2/6 extra (including postage of replies). Situations wanted 2d. per word throughout.

Advertisements accompanied by a remittance and replies to Box Numbers should be addressed to the Advertisement Manager Iron and Coal Trades Review, John Adam House, 17/19, John Adam Street, London, W.C.2. If received by first post Tuesday, they can normally be accommodated in the next Friday's issue.

SITUATIONS VACANT

WANTED: Experienced POWER STATION SUPERINTENDENT to assist erection, operation and maintenance of a small power station at Gabia, West Africa. Plant comprises: 700 kW Fraser & Chalmers condensing turbine, 250 p.s.i., with Babcock & Wilcox watertube boiler, 400/440 volts, 3 phase, 50 cycles, accessories, switch gear and general plant. Excellent remuneration. Accommodation, medical service available. Box WE318, IRON AND COAL TRADES REVIEW.

INLAND REVENUE VALUATION OFFICE.

PENSIONABLE posts for qualified men at least 25 on 1.10.60 as 2nd or 3rd Class VALUERS in the Mineral Section, which has offices at London, Birmingham, Leeds, Newcastle upon Tyne, and Cardiff. Qualifications: Final Examination of R.I.C.S. (preferably in Mining subdivision) or 1st Class Certificate of Competency (Mine Managers); knowledge of mining subsidence and the principles of valuation of minerals; at least four years' experience of mining. Starting salary (men, London): 3rd Class from £830 (25) to £1,205 (36 or over); scale maximum £1,300. 2nd Class scale £1,325—£1,835. Promotion prospects. Write CIVIL SERVICE COMMISSION, Burlington Gardens, London, W.1, for application form quoting 148-149/60. Closing date 18th October, 1960.

IMPERIAL CHEMICAL INDUSTRIES LIMITED, NOBEL DIVISION, has a vacancy for a SERVICE ENGINEER aged about 30 years. Applicants should hold a University Mining Degree and preferably, in addition, a Mine Manager's First Class Certificate of Competency. Salary will be in accordance with qualifications and experience.

The successful candidate will be based in Glasgow for about two years, but thereafter at Stevenston, Ayrshire, and it would be as well for him to live in the Stevenston area, an allowance being made for travel to Glasgow meantime.

A reasonable refund of removal (including travel) expenses would be made if a move is necessary, and a lodging allowance would be paid for a limited period while the candidate has to maintain two homes.

To assist in house purchase, facilities are available in approved cases for loans; in addition legal fees may be advanced.

Application should be made in writing to the STAFF MANAGER, 460, Sauchiehall Street, Glasgow, C.2.

BLAST FURNACE ASSISTANT MANAGER required, preferably with all-round practical experience of modern mechanically charged furnaces.

Applications, which will be treated in confidence, should give details of experience, etc., and be addressed to:—

DIRECTOR & GROUP GENERAL MANAGER,
South Durham Steel & Iron Co., Ltd.,
South Works,
Greatham,
West Hartlepool,
Co. Durham.

SITUATIONS VACANT—*contd.*

Production and Works Manager.

SMALL Steel Re-Rolling Mill in Glasgow Area requires PRODUCTION AND WORKS MANAGER with good technical qualifications and practical background of the trade, age 30/40. Development of the Mill to produce "Specials" is envisaged with the consequent necessary re-equipment and reorganisation, for which the new Manager would have major responsibility.

This project offers great scope to an intelligent, imaginative and energetic young man. Remuneration would be commensurate with the responsibility of the position.

Applications should include all relevant information, including age, training and experience, and be addressed to the MANAGING DIRECTOR, Box No. 2768, Wm. Porteous & Co., Glasgow.

MELTING SHOP SHIFT MANAGER

required for

MIDLAND STEEL WORKS

Good prospects, Pension Fund.

Full details of age, experience and qualifications to BOX MS319, IRON AND COAL TRADES REVIEW.

LARGE Midlands Steel Works, Birmingham Area, requires a SENIOR DESIGN SECTION LEADER DRAUGHTSMAN Applicants should have had experience of Steel Works or Heavy Engineering, including foundation and lay-out work. Alternate free Saturday. Social, recreation and canteen facilities. Pension and free insurance scheme in operation. Apply, stating age, qualifications, details of experience and salary level expected, to BOX LM320, IRON AND COAL TRADES REVIEW.

SENIOR ENGINEER required to take charge technically and promote sales of ELECTROSTATIC PRECIPITATION plant with particular reference to steelworks, fume problems. Interesting position requiring previous experience and initiative which will be appropriately rewarded. Write Box SE321, IRON AND COAL TRADES REVIEW.

NOTTINGHAM AND DISTRICT TECHNICAL COLLEGE.

Burton Street, Nottingham.

Principal: D. A. R. CLARK, M.Sc. (Tech.), M.I.Mech.E.

APPLICATIONS are invited for the following vacancy:
ASSISTANT LECTURER, GRADE B, IN MINING ELECTRICAL ENGINEERING.

Salary in accordance with the Burnham Technical Scale as follows:—£700 × £27 10s. to £1,150 per annum plus additions for qualifications and training. Commencing salary according to previous experience.

Research encouraged. Facilities and equipment available.

Further particulars and form of application may be obtained from the PRINCIPAL, to whom completed forms should be returned not later than 8th July, 1960.

SITUATIONS VACANT—*contd.*

STEWARTS AND LLOYDS LIMITED

require a

MOULDING SHOP SUPERINTENDENT

TO take charge of Moulding, Coremaking and Sand Preparation Departments at their TOLLCROSS STEEL FOUNDRY, near GLASGOW.

Applicants should have a thorough practical knowledge of modern steel foundry practice, including air-set oils, and should preferably have worked with both alloy and plain carbon steel castings in the weight range up to 6 tons.

Written applications, giving full details of education, qualifications, experience and age, should be sent to MANAGER, Personnel Services, Clyde Office, Coatbridge.

LARGE Midland Steel Works, Birmingham Area, requires MECHANICAL DRAUGHTSMAN for layout and detail work in connection with development and maintenance. Applicants should have a good knowledge of Heavy Engineering. Steelworks experience an advantage but not essential. Excellent prospects to suitable applicant. 38-hour week. Alternate free Saturday. Social recreation and canteen facilities. Pension scheme. Apply stating age and experience to Box LM315, IRON AND COAL TRADES REVIEW.

AUCTIONEERS AND VALUERS

HENRY BUTCHER & CO.

Specialists Auctioneers and Valuers of Plant and Machinery
Factory Agents and Surveyors

Fire Loss Assessors

73 CHANCERY LANE
LONDON, W.C.2
Telephone: HOL. 8411 (8 lines)

FULLER HORSEY
SONS & CASSELL

Specialists in the

SALE & VALUATION

of INDUSTRIAL PLANT & PROPERTIES of ALL TYPES

SINCE 1807

10 LLOYD'S AVENUE
LONDON E·C·3
TELEPHONE: ROYAL 4861
Rathbone

AUCTIONEERS AND VALUERS —contd.

MICHAEL FARADAY & PARTNERS
Established 1896
CHARTERED SURVEYORS
Valuations of Factories, Works & Plant for all purposes.
Specialists in Rating & Derating of Industrial Premises, Machinery & Plant
40, BROOK STREET, LONDON, W.1
Telephone: GROsvenor 8446 (5 lines)

EDUCATIONAL

MINING EXAMS.—Expert Coaching by Postal Tuition.—Apply UNIVERSAL MINING SCHOOL (Dept. R.), 60, Connaught Road, Cardiff.

MATERIALS FOR SALE

STEEL TUBING.

14 in. bore—20/25 ft. lengths—300 ft.
27 in. „ —20/25 ft. „ —350 ft.
30 in. „ —20/25 ft. „ —600 ft.
36 in. „ —20/25 ft. „ —600 ft.
48 in. „ —20/25 ft. „ —100 ft.

The above tubes are new and unused. Full details and attractive prices will be quoted upon application. Available for immediate delivery.

DOWNINGS (BARNSLEY) LIMITED,
Doncaster Road, BARNSLEY, Yorkshire.
Tel.: Barnsley 3603/4/5.

WANTED

5-TON Secondhand Top charged Electric Arc Steel Melting Furnace required. Not exceeding 20 years old. Box TS, IRON AND COAL TRADES REVIEW.

WANTED. 15/20 secondhand steel framed (preferably all steel) low sided railway wagons, to carry 10/15 ton each, for internal works use. Box WA317, IRON AND COAL TRADES REVIEW.

MACHINERY FOR SALE

TWW

HYDRAULIC PRESSES

NEW 1,000 ton Hugh Smith (Possil), Ltd., 4-column Upstroke, ram 25½ in. dia.; stroke 5 ft.; daylight 10 ft.; table area 10 ft. × 10 ft. Motor driven Towler Electraulic Pumps operating at 4,500 lb. p.s.i. w.p.
500-ton Fielding & Platt 4-column Downstroke; stroke 24 in.; daylight 65 in.; between columns 34 in. × 24 in. Fraser OLS30 Hyd. Pumps, 3,200 lb. p.s.i. w.p.
200-ton Fawcett Preston 4-column Downstroke; stroke 24 in.; 26½in. between columns.
190-ton Shaw 4-column Upstroke Plunger Press, main ram 19 in. dia. × 17 in. stroke. Downstroke Plunger ram 8 in. dia., 36 in. between columns.
100-ton Fielding & Platt 4-column Downstroke; stroke approx. 6 ft.; daylight 8 ft. 3 in., working area 25 in. × 27 in.; Fraser OL830 Hyd. Pump, 3,200 lbs. p.s.i. w.p.

THOS W. WARD LTD.
ALBION WORKS · SHEFFIELD
Phone: 26311 'Grams: "Forward"
Remember - Wards might have it!

MACHINERY FOR SALE—contd.

FOR SALE. 300 KW. Mercury Arc Rectifier, input 6,600 volts, output 500 volts 600 amps. with tappings. By E.C.C. Equipment about 4 years old, practically unused. Price £1,250, original cost £4,000. DAVIDSONS ENGINEERS (M/C) LIMITED, Irkdale Street, Smedley Road, Cheetham Hill, Manchester 8. Tel. No. COLlyhurst 1610.

PORTABLE RAILWAY.

FIVE miles new 2-ft. gauge 20-lb. Railtrack.
200 Hudson, 2-ft. gauge 27-cu. ft., Steel Side Tipping Wagons.
150 Platform Wagons, 2-ton and 4-ton capacity, 2-ft. gauge.
JOSEPH PUGSLEY & SONS, LTD.,
Bristol, 5.
Tel.: Bristol 56037.
Grams.: "Piston," Bristol.

FOR SALE.

SECONDHAND Steel Sections, Channels, Angles and Joints. Secondhand Railway Material.

THE MOTHERWELL MACHINERY & SCRAP CO., LTD.
P.O. Box No. 15,
INSHAW WORKS,
MOTHERWELL.
Telephone: Motherwell 4536/7/8.
Telegrams: "Scrap," Motherwell.

AIR COMPRESSORS for sale. Two 2,500 cu. ft. Belliss Morcom, 100 p.s.i. 550 h.p. motors; 2,300 c.f.m. Holland Rotary 3-stage 150 p.s.i., 400 cu. ft. Broomwade EH245, new 1943, 90 h.p.; 300 c.f.m. Broomwade EH240, 100 p.s.i. 60 h.p.; 250 c.f.m. Belliss Morcom, 100 p.s.i., 60 h.p.; 223 c.f.m. Broomwade D23, 100 p.s.i., 45 h.p. Also numerous others, and Air Receivers 1 ft. to 9 ft. dia., 100 to 1,000 lb. pressure.
LOCOS—Two Fowler 150 h.p. diesel; 2 Barclay 80 h.p. diesel, 0-4-0; 2 Ruston 16/20 h.p. 24 in. gauge diesel; 2 Hudson 20 h.p. 24 in. gauge diesel; 4 Logan 3-4 ton 24 in. gauge, battery operated, including two flameproof.
E.O.T. CRANES—25 ton girders and end carriages with 60 h.p. motors, 95 ft. 10 in. span; 30 ton Vaughan, 42 ft. 3 in. span; 25 ton Clyde, 21 ft. 9 in. span, new 1954; 20 ton King, 42 ft. 3 in. span, almost new; 10 ton Anderson Grice, 42 ft. 3 in. span (two); 5 ton Henderson, 24 ft. 7½ in. span, 1946; 5 ton King, 29 ft. 3 in. span; 4 ton Morris, 19 ft. span, 220 v. D.C. (3).
LOCO CRANES, STANDARD GAUGE—18 ton Brownhoist steam, 50 ft. jib; 10 ton Grafton, diesel conversion, 34 ft. jib; 8 ton Wilson steam, 35 ft. jib; 5 ton Smith steam, 50 ft. jib (2); 5 ton Grafton diesel, 35 ft. jib (2); 3 ton Smith steam, 25 ft. jib.
STEEL AND CAST IRON PIPING—Most sizes, ¼ in.—60 in., including 2, 3, 4 and 6 in. Victaulic. 1¼ in., 2½ in., 3 in. galvanised, 16 in., 20 in., 24 in., 26 in. 27 in. and 28 in. UNUSED BITUMEN LINED AND COATED WITH JOHNSON COUPLINGS. Special Parcels;
20,000 ft. 6 in. × 3/16 in., ¼ in., 5/16 in., unused steel seamless.
10,000 ft. 8 in. × ¼ in., unused steel seamless.
2,000 ft. 24 in. × ¼ in., unused welded seamless.
1,000 ft. 30 in. × ⅜ in., unused welded seamless.
250 × 18 ft. lengths 6 in. unused cast iron spigot and socket, Stanton class "B."
300 × 12 ft. lengths 10 in., unused, cast iron flanged.
List on request.
FRED WATKINS (ENGINEERING) LTD.
Coleford, Glos.
Tel.: Coleford 2271/2.

MISCELLANEOUS

SHOTBLASTING—METAL SPRAYING —COATING. Epikote, Araldite, P.T.F.E., P.T.F.C.E., Polythene, P.V.C. Neoprene, and Hypalon coatings applied on site or at works. LOYNE, LIMITED, Margaret Street, Ashton-under-Lyne, Lancs. Tel. No.: 4551/2/3.

For **TURBINE PUMPS**
WRITE TO
PULSOMETER ENG. CO., LTD.
READING
LONDON OFFICE:—
PULSOMETER HOUSE,
29/26 LAMB'S CONDUIT STREET, W.C.1.

You get MORE WORK out of
Standall
MINING TOOLS
FOR *COAL GETTING*

There's a Standall Tool to fit your type of machine. Send for list 2155.
STANDALL
ENGINEERING LTD.
Mickley Works, Dronfield Woodhouse, Sheffield, England
Phone: 72583
Grams: "Upset"

RAILWAY MATERIAL
COMPLETE INSTALLATION OF
NEW SIDINGS
Sites Surveyed and Layouts Prepared
Rails of all sections, and all accessories, tools, plant, etc.
ARMYTAGE & SONS, LTD.
LEADMILL RD., SHEFFIELD, 1
Phone: 21371/2

RAILWAY MATERIALS
SLEEPERS & TIMBERS
Send your Enquiries to
S. RHODES & CO.
BRIGHTSIDE LANE
SHEFFIELD 9
TELEPHONE 43237 SHEFFIELD
TELEGRAMS "RHODES & CO SHEFFIELD"

A Survey of MINING ENGINEERING

Edited by Sir Andrew Bryan & F. H. Harley

Eighteen famous authorities have contributed to a work which will for years be indispensable to every mining engineer and colliery executive and technician. Never before has current practice in every relevant field been so clearly and comprehensively dealt with in a single volume.

CONTENTS:

Ventilation Practice
By J. G. Bromilow, B.Sc. (Hons.), M.I.Min.E.

Winding
By Norman Dudley, B.Sc., A.K.C., A.M.I.E.E., A.I.Mech.E., A.I.Min.E.

Coal-cutters and Power-loaders
By F. S. Atkinson, M.Eng., M.I.Min.E., A.M.I.C.E.

Strata Control and Support
By W. J. Adcock, A.I.Min.E.

Instrumentation in Roof Support and Control
By W. H. Walton

Communication Equipment and Systems
By R. Gill, B.Sc.(Eng.), A.C.G.I., A.M.I.E.E., M.A.M.E.M.E.

Conveyor Haulage
By A. Grierson, B.Sc., M.I.Min.E.

Locomotive Haulage
By T. E. Green, M.I.Mech.E. M.I.E.E.

Transport other than Conveyor or Locomotive
By W. Rowell, B.Sc., M.I.Min.E.

Power Below Ground
By P. N. Wyke, B.Sc., M.I.E.E., M.I.Min.E.

Compressed Air, Hydraulic Power, and Machinery Drives
By A. E. Crook, C.B.E., M.I.Mech.E., M.I.Min.E., F.A.M.E.M.E.

Pumping Practice
By H. Saul, B.Sc.(Eng.), M.I.Min.E.

Drilling in Coal and Rock
By F. W. Wood, M.I.Min.E. F.G.S.

Explosives
By R. Westwater, B.Sc., Ph.D., M.I.Min.E.

Mine Lighting
By A. Roberts, M.Sc., Ph.D.

Preparation of Coal for the Market
By A. Grounds, B.Sc., M.I.Min.E., F.Inst.F.

The 1959 Mining Machinery Exhibition
By Sir Andrew Bryan

Shaft Sinking and Tunnelling
By R. W. Anderson, M.C., B.Sc., M.I.M.E.

Copies, price FIFTEEN SHILLINGS post free, are now available from stock and can be obtained from the Publishers:

IRON & COAL TRADES REVIEW

17/19 JOHN ADAM STREET
LONDON W.C.2

Use
MELLOPAD
Anti-vibration material...

...for incorporation in the concrete foundations of power hammers, drop stamps, foundry jolters to reduce transmission of vibration.

Also for the isolation of precision machines from external disturbances.

The picture shows Mellopad laid in a pit preparatory to casting the concrete block for a precision grinder, capacity 24 ft. x 18" dia.

Write to us for particulars and recommendations.

Photograph by courtesy of Messrs. Marfleet & Weight Ltd. Melbourne, Australia.

MELLOWES & CO. LIMITED. SHEFFIELD. 3.

28% *MORE de-watering area with* Lockwedge WEDGE WIRE screens.

Lockers Wedge Wire Sieves are made in practically any metal. The apertures enlarge downwards so that the slits do not blind or clog. The special strength-bracing permits the use of lighter gauge wire. Construction is extremely rigid, ensuring long life without mesh distortion.

There is over 150 years of accumulated experience behind every Locker product. Send for illustrated catalogue.

Send now for illustrated catalogue.

Locker Industries Limited
WEDGE WIRE DIVISION
WARRINGTON, ENGLAND. Telephone: Warrington 34111/6
London Office: CLUN HOUSE, SURREY ST., W.C.2. Telephone: TEMple Bar 8559

MILLOM HEMATITE

THE WEST COAST STANDARD

Millom brand of West Coast Hematite is of unrivalled reputation.
It is "the West Coast Standard."

INGOT MOULDS
Of our usual excellent quality.

REFINED MALLEABLE PIG IRON
Cupola-cast in small pigs — is specially favoured for sound malleable castings.

MILLOM MACHINE CAST PIG IRON
free from Sand and Sows.

SPECIAL CYLINDER IRONS
Particularly suitable for Cylinders, Pistons, I.C. Engine parts or other highly stressed components. Special Irons for Rolls.

ANNEALING ORES FOR MALLEABLE TRADE
Crushed and screened to customer's requirements and entirely free from dust.

MILLOM HEMATITE ORE & IRON Co., Ltd.,
MILLOM, CUMBERLAND
Tel.:—Millom 265, 266 & 267 (3 lines)
'Grams:—"Ironworks," Millom Telex No. 6561

WORSLEY MESNES IRONWORKS LTD.
WIGAN

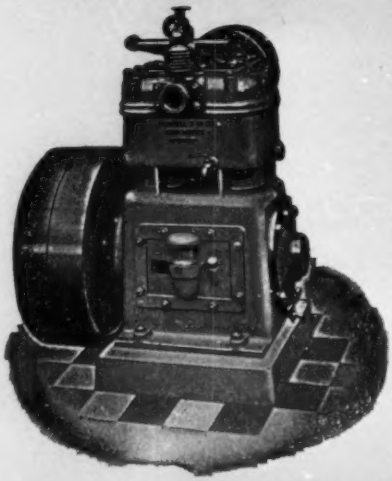
are Manufacturers of all Types of
MINING MACHINERY

•

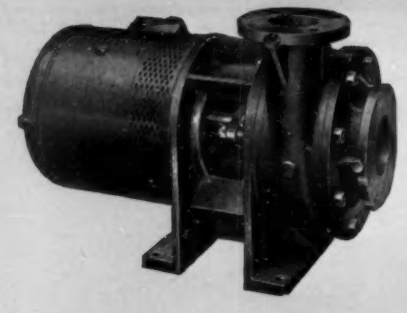
Specialists in
Winding Drums · Drum Shafts and Breakdown Repairs

Telephone : 2246
Telegrams : "ENGINES," WIGAN

AIR COMPRESSORS
AND DRY VACUUM PUMPS
VERTICAL SINGLE-ACTING TYPE



CAPACITY: UP TO 300 CU. FEET PER MIN.
PRESSURE: UP TO 100 LBS. PER SQ. IN. OR VACUUM
ELEVEN SIZES KEPT IN STOCK
For sizes of compressors and particulars of other types, write to
REAVELL & Co. Ltd., IPSWICH
Tel.: Nos. 2124 and 2125 Ipswich *Grams:* "Reavell, Ipswich"



One of a range of fine pumps for a variety of duties

SAFRAN
REGISTERED TRADE MARK
PUMPS

The Self Contained Electric set illustrated is made in 9 sizes: ¾″/¾″-5″/6″ for duties up to 900 G.P.M. The pumps, having unishaft drive, are compact overall and require only a minimum footing for installation. Can also be mounted vertically provided motor is uppermost.

Please indicate below the type of Safran Pump of which you require full technical details and prices.

1	SCE as illustrated	
2	DIRECT COUPLED SETS	
3	ENGINE DRIVEN SETS	
4	MULTISTAGE PUMPS	
5	AUTOMATIC SELF PRIMING SETS	
6	VERTICAL TRUNK PUMPS	
7	SUMP PUMPS	
8	WATER CIRCULATORS	

SAUNDERS VALVE COMPANY LIMITED

Safran Pump Division

DRAYTON STREET · WOLVERHAMPTON

a place in the Hall of Fame

What is special about Harland Ulectriglide submersible pumpsets?

Pump and motor built under the same roof by men with over 50 years' experience on the manufacture of borehole pumps and associated electric motors.

Harland commenced the development of submersible pumpsets 25 years ago and have gained wide experience in the balanced design of the two components.

The Harland submersible motor is of the all wet type and is therefore easy to maintain and overhaul as it does not rely on special seals between rotating and stationary parts.

A special study has been given to the design of journal and thrust bearings which form the most important part of any machine operating under water.

Harland offer standard Ulectriglide submersible pumpsets from 20 to 130 h.p. against short depstaches. An after sales service scheme is designed to give you complete satisfaction.

HARLAND

ulectriglide submersible pumpsets

THE HARLAND ENGINEERING CO. LTD.
ALLOA, SCOTLAND

London Office—HARLAND HOUSE, 20 PARK STREET, LONDON, W.1. Phone—GROsvenor 1221

Branches—BRISTOL, GLASGOW, LEEDS, TIMPERLEY (CHESHIRE), NEWCASTLE-UPON-TYNE, NOTTINGHAM, WOLVERHAMPTON AND OVERSEAS

A19/61

Rails for sale

100 Tons New Slightly Defective B.H. RAILS, 95 lbs. yard. Chiefly 60ft.

100 Tons Slightly Defective F.B. RAILS, 109 lbs. yard. Chiefly 60ft. lengths.

100 Tons New Slightly Defective F.B. RAILS, 91 lbs. yard. Chiefly 42ft.

100 Tons Good Secondhand B.H. RAILS, 80/85 lbs. yard. B.S. Section. Chiefly 60ft.

100 Tons Secondhand Bull Head RAILS, 90/95 lbs. yard. Chiefly 44ft. 6in lengths.

50 Tons New Slightly Defective F.B. RAILS, 93-34 lbs. yard. Chiefly 41ft.

50 Tons New Perfect F.B. RAILS, 75 lbs. yard, R.B.S. Chiefly 40ft. lengths.

1,500 Tons Stock Rusty F.B. RAILS, 75 lbs. yard, R.B.S. Chiefly 30/36ft.

50 Tons New Slightly Defective F.B. RAILS, 80 lbs. yard. Revised B.S. Section. Lengths chiefly 40ft.

30 Tons Secondhand F.B. RAILS, about 60 lbs. yard. 24ft., 27ft., 30ft. and 45ft.

10 Tons Secondhand Coach Screws, 6½in. by 1½in. Standard Railway Pattern.

50 Tons Mild Steel Flat 5in. by ½in. New but Stock Rusty 15ft. to 26ft. chiefly.

400 Tons Good S.H. Relayable B.H. Rails, 90/95 lbs. in 45 ft. lengths.

WARDS ALSO HAVE LARGE STOCKS OF ALL CLASSES OF OTHER RAILWAY MATERIALS

THOS. W. WARD LTD

ALBION WORKS, SHEFFIELD

PHONE: 26311 (22 LINES) 'GRAMS: "FORWARD, SHEFFIELD"

LONDON OFFICE:

BRETTENHAM HOUSE, LANCASTER PLACE, STRAND, W.C.2

Phone: TEM 1515 (12 lines)

BRIGHT STEEL

ROUNDS, SQUARES, HEXAGONS, FLATS AND SECTIONS

THE HALESOWEN STEEL CO. LTD.

HALESOWEN,
Nr. Birmingham
HALESOWEN 1191

8 Chatham Street,
MANCHESTER, 1
CENTRAL 0413

196/7, Palace Chambers,
Bridge Street,
LONDON, S.W.1
WHITEHALL 2015

Our wide experience in the design and manufacture of winding and haulage machinery is at your disposal. We will submit proposals for any application, with any form of drive, electric or otherwise.

60 years of service to the mining industry

TINSLEY DARLINGTON

JOHN TINSLEY LIMITED, ENGINEERS
Neasham Road, Darlington, England.
Telephone: Darlington 68444. Telegrams: Mining, Darlington

THE LATEST DEVELOPMENT IN
TOTALIZING WEIGHERS
for belt conveyors

Original in design—
Outstanding in performance

★ TOTALLY ENCLOSED INDICATOR
★ SELF-LUBRICATING
★ SELF-CONTAINED UNIT CONSTRUCTION

BLAKE-DENISON Model 125

DENISON

SAML. DENISON & SON LTD.
HUNSLET FOUNDRY, MOOR ROAD, LEEDS 10.
Telephone—LEEDS 75488.

Area Offices at LONDON SLOane 4628 · BIRMINGHAM Midland 3931 · MANCHESTER Blackfriars 1986 · LEEDS Leeds 2-8433

9

BAIRDS & SCOTTISH STEEL LTD.

Wrought Iron & Steel Dept.:

46, NORTH HANOVER STREET, GLASGOW, C.1.

Telegrams: "Scotsiron," Glasgow.
Telephone: DOUglas 4031 (4 lines).

London Agents:
Finlay & Hodgson, 16, St. Helen's Place, E.C.

Manufacturers of Iron and Steel to British Standard Specifications, and all usual tests. Wide Range of Sizes.

IRON

High Class Bar Iron

In Bars, Angles, Tees, Channels, etc., Tube Hoops and Strips, Horse Shoe Bars, Tyre Bars, Reeled Bars.

STEEL

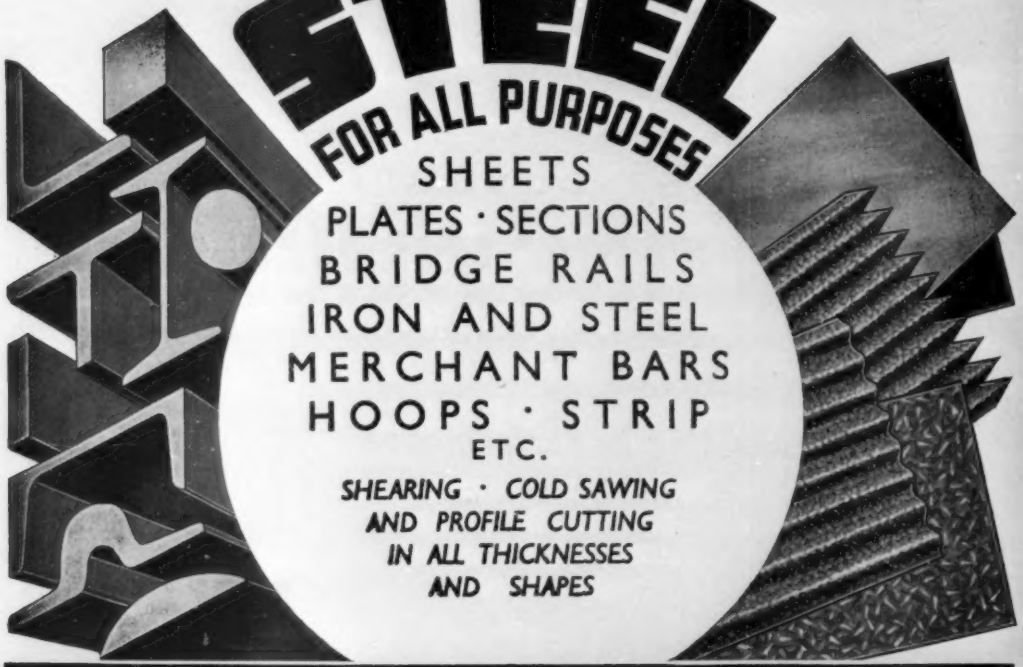
Open Hearth Process "NORTHBURN" Brand

In Blooms, Slabs, Billets, Light Rails and Rolling Stock Sections, Splayed Coopers and Baling Hoops, Bars, Angles, Tees, Hoops and Strips.

STEEL FOR ALL PURPOSES

SHEETS
PLATES · SECTIONS
BRIDGE RAILS
IRON AND STEEL
MERCHANT BARS
HOOPS · STRIP
ETC.

SHEARING · COLD SAWING AND PROFILE CUTTING IN ALL THICKNESSES AND SHAPES



Telephone TIPTON 1611 10 LINES

HALL BROS (WB) LTD

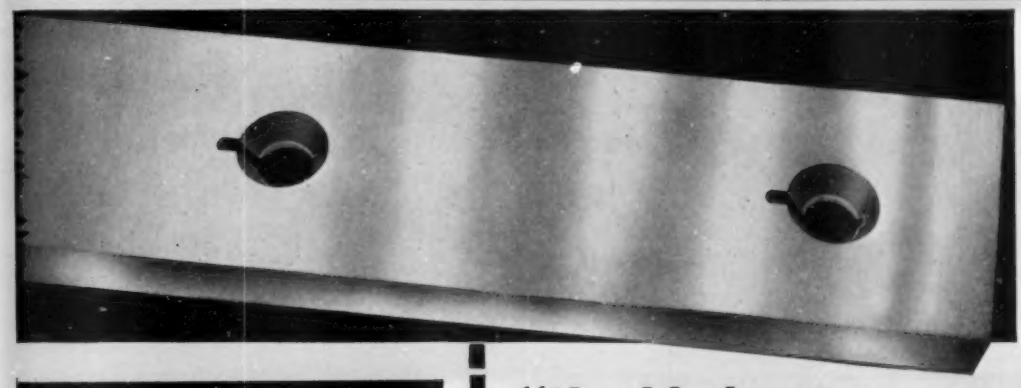
EAGLE WORKS · GREETS GREEN
WEST BROMWICH

Telegrams Eagle, W.Bromwich

BUXTON CERTIFIED
FLAMEPROOF
MOTORS
(GROUPS 1 2 & 3)
ROBUST STEEL-FRAMED
SUPER HIGH TORQUE
5 TO 150 HP
Quick deliveries at competitive prices
WITH TERMINAL BOX AND GLAND OR PLUG AND SOCKET POSITIONED TO REQUIREMENTS

DAVID McCLURE LTD.,
Tel—STOckport 3653/4 Grams—Motors, Stockport.

RANGE ROAD, ADSWOOD,
STOCKPORT



ZANOGEN
SHEAR BLADES
Established 1832

"the blade you can fit and forget"

W. FEARNEHOUGH LIMITED
Garden Street, Sheffield 1 Tel: 23247 Telex: Sheffield 54143

SMALLMAN HAULAGE CLIPS

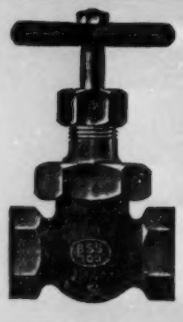
AUTOMATIC DETACHMENT

21 SIZES TO SUIT ALL CONDITIONS

STEEL THROUGHOUT

Sole Manufacturers :—

JAMES W. SMALLMAN, LTD. ● NUNEATON



. . . FOR

VALVES AND COCKS

OF EVERY TYPE

AND ALL NEEDS FOR STEAM, GAS, WATER, AIR AND OIL INSTALLATIONS

WRITE OR PHONE :—

BRITISH STEAM SPECIALTIES LTD

FLEET STREET, LEICESTER

WILLCOX'S

ENGINEERING SUPPLIES

W. H. WILLCOX & CO. LTD., SOUTHWARK ST., LONDON, S.E.1

IN CASE OF FIRE

CUT OFF THE OIL SUPPLY TO YOUR BOILER HOUSE QUICKLY WITH THE . . .

NABIC *Quick Release Fitting*

For use with oil firing equipment, dampers and fire screens, etc.

Full details from :—

THE NATIONAL BOILER & GENERAL INSURANCE CO. LTD.

Sales Department :—

St. Mary's Parsonage, Manchester 3

Metal treatment

and Drop Forging

A monthly journal devoted to the properties, uses, testing and treatment of special steels and light alloys, and to forging technique in all its branches. 2/6d. per copy, 30/- yearly.

●

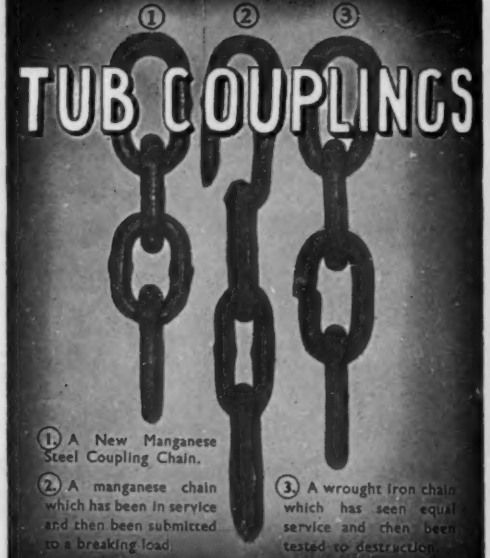
Write for a specimen copy to :

Metal Treatment & Drop Forging

John Adam House,

17/19 John Adam Street, London, W.C.2.

HIGH MANGANESE · LOW CARBON STEEL



TUB COUPLINGS

1. A New Manganese Steel Coupling Chain.

2. A manganese chain which has been in service and then been submitted to a breaking load.

3. A wrought iron chain which has seen equal service and then been tested to destruction.

M. COULSON & Co. LTD

MERRINGTON LANE IRONWORKS, SPENNYMOOR.

FOR ALL TYPES OF EXCAVATION
FOR UNDERGROUND DEVELOPMENT
... AND SURFACE OR UNDERGROUND CEMENTATION OF HEATINGS, WATER SEALINGS, FOUNDATIONS, ETC.

Blandford-Gee
DONCASTER

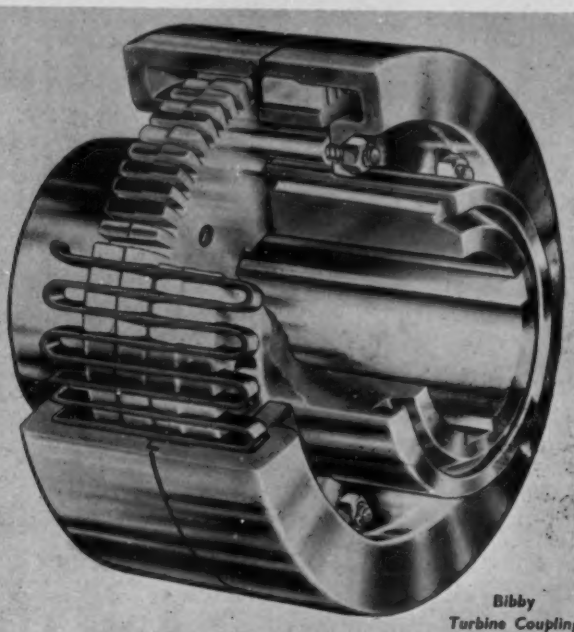
SPECIALISTS IN
SHAFT SINKING - SHAFT REPAIRS
PIT BOTTOMS - SKIP POCKETS
JUNCTIONS - TUNNEL DRIVING ETC.

THE BLANDFORD-GEE CEMENTATION CO. LTD. BALBY BRIDGE, DONCASTER
Telephone DONCASTER 2701, 65682

The BIBBY Resilient COUPLING

World famous for outstanding performance and reliability. Made in a wide range of types, all employing the same basic principle of Bibby design.

Special types include: Brakewheel, Cardan Shaft, Turbine, Shear pin, Controlled Torque, Spacer and others.



Bibby Turbine Coupling

THE WELLMAN BIBBY COMPANY LIMITED, PARNELL HOUSE, WILTON ROAD, LONDON, S.W.1

INDEX TO ADVERTISERS—*continued from page 68.*

Jarrow Metal Industries Ltd. —
Jenkins, W. J. & Co. Ltd. .. 14
Johnsons Rolls Ltd. .. 36
Jones, W. Stanley (Engineers) Ltd. .. .. —
Joy-Sullivan Ltd. .. .. —

Keelavite Hydraulics Ltd. .. —
Kennedy, Allan & Co. Ltd. .. —
Kenyon, Wm. & Sons Ltd. .. —

Lafarge Aluminous Cement Co. Ltd. .. .. .. —
Lanarkshire Bolt Ltd. .. —
Lancaster & Tonge Ltd. .. —
Lane, Francis & J. S. Ld. .. —
Le Boutillier, John Ltd. .. —
Ledward & Beckett Ltd. .. —
Lever, J. & Sons Ltd. .. —
Leverton of Leeds Ltd. .. —
Lilleshall Co. Ltd. 5
Lindley, H. Ld. .. 24 & 25
Lockers Industries Ld. .. 57
Lodge-Cottrell Ltd. .. .. —
Longleys (Barnsley) Ltd. .. —
Lumb, Jas. & Sons Ltd. .. —
Lysaght's, John Scunthorpe Works Ld. 39

Mackley, E. N. & Co. Ld. .. —
M. & C. Switchgear Ld. .. —
Markland Scowcroft Ld. .. —
Marshall, Thos. & Co. (Loxley) Ld. .. .. .. —
Martin Black & Co. (Wire Ropes) Ld. .. .. .. —
Mason, Adam & Sons Ld. .. —
Massey, B. & S. Ld. .. .. —
Mastabar Mining Equipment Co. Ld. .. .. .. —
Mather & Platt Ld. .. .. —
Matthews & Yates Ld. .. —
Mavor & Coulson Ld. .. —
McCall & Co. (Sheffield) Ld. .. —
McClure, David Ld. 63
Mellowes & Co. Ld. 57
Metalectric Furnaces Ld. .. —
Metallurgical Equipment Export Co. Ld. .. .. —
Metropolitan-Vickers Electrical Co. Ld. .. .. .. —
Michael & Partners Ld. .. —
Midgley & Son Ld. .. .. —
Midland Galvanizers Ld. .. —
Millom Hematite Ore & Iron Co. Ld. 58
Mills, James Exors. of .. —
Millspaugh Ld. .. .. —
Mine Safety Appliances Co. Ld. .. .. —
Mining Engineering Co. Ld. .. 3
Mitchell Ropeways Ld. .. 60
Mobil Oil Co. Ld. .. .. —
Moler Products Ld. .. .. —
Mond Nickel Co. Ld. .. —
"Monitor" Patent Safety Devices Ld. .. .. —
Mono Pumps Ld. .. .. —
Moorwood, John M. Ld. .. —
Morgan Refractories Ld. .. 19
Morris, Robert Ld. 22
Murex Welding Processes Ld. —
Muschamp, N. J. & Co. Ld. .. —

National Boiler & General Insurance Co. Ld. 64
National Industrial Fuel Efficiency Service .. .. —
Neal, R. H., & Co. Ld. .. —
Needham Bros. & Brown Ld. 29
Neill, Jas. & Co. (Sheffield) Ld. —
Nelson, W. & H. Ld. .. .. —
Newalls Insulation Co. Ld. .. —
Newell, Ernest & Co. Ld. .. —
New Conveyor Co. Ld. .. —
Newton Chambers & Co. Ld. —
Niagara Screens & Plant Ld. 67
Nife Batteries .. .. —
Nordberg Manufacturing Co. Ld. .. .. .. —
North British Rubber Co. Ld. .. .. .. —
North Eastern Marine Engineering Co. Ld. 51
Norton Harty Engineering Co. Ld. .. .. .. —
Norton, Sir James Farmer & Co. Ld. .. .. —
Nortons Tividale Ld. 23

Oldham & Son Ld. .. .. —
Ormerod, Edward & Co. Ld. —
Osborn, S. & Co. Ld. .. .. —
Oughtibridge Silica Firebrick Co. Ld. .. .. .. —

Padley & Venables Ld. .. —
Parsons, C. A. & Co. Ld. .. —
Parsons Chain Co. Ld. .. 44
Parsons Marine Turbine Co. Ld. 51
Patterson Lamps (1953) Ld. —
Pegson Ld. .. .. .. —
Permutit Co. Ld. .. .. —
P.G. Engineering Ld. .. —
Pickford Holland & Co. Ld. 34
Pitman, Sir Isaac & Sons Ld. —
Plowright Bros. Ld. .. .. —
Power Gas Corporation Ld. .. —
Power Gas Economy Co. .. —
Power Plant Co. Ld. .. .. —
Premier Cooler & Engineering Co. Ld. .. .. .. —
Press, Wm. & Son Ld. .. —
Price, J. T. & Co. Ld. .. .. —
Priest Furnaces Ld. .. .. —
Proctor Bros. (Wireworks) Ld. —
Protector Lamp & Lighting Co. Ld. .. .. .. —
Pulsometer Eng. Co. Ld. .. 55

Qualter, Hall & Co. Ld. .. —

Railway & General Engineering Co. Ld. .. .. —
Raine & Co. Ld. .. .. —
Ransomes & Marles Bearing Co. Ld. .. .. .. —
Rawlplug Co. Ld. .. .. —
Reavell & Co. Ld. 58
Reay Brass Foundry Co. Ld. —
Reid Gear Co. Ld. .. .. —
Renold Chains Ld. .. .. —
Reside, Jas. Ld. 8
Revolvo Ld. .. .. .. —
Reyrolle, A. & Co. Ld. .. —
Rheolaveur General Construction Ld. .. .. .. —
Rhodes, S. & Co. Ld. 55
Rhymney Engineering Co. Ld. —
Richards, Chas. & Sons Ld. —
Richardsons Westgarth Atomic Ld. 51
Richardsons Westgarth (Hartlepool) Ld. 51
Rigley, Wm. & Sons Ld. .. —
Robertson, W. H. A. & Co. Ld. —
Robey & Co. Ld. 17
Robson, Geo. & Co. (Conveyors) Ld. .. .. .. —
Rocol Ld. 15
Ropeways Ld. .. .. —
Ross Engineers Ld. 40
Round Oak Steel Works Ld. —
Ruston & Hornsby Ld. .. —
Ruston-Bucyrus Ld. .. —

Sack, Maschinenfabrik, G.m.b.H. .. .. .. —
Salem-Brosius (England) Ld. —
Saunders Valve Co. Ld. .. 59
Shaw, Son & Greenhalgh Ld. —
Shaw, W. & Co. Ld. .. .. —
Sheepbridge Equipment .. —
Sheffield Twist Drill & Steel Co. Ld. .. .. .. —
Sheffield Wire Rope Co. Ld. —
Siemens-Schuckert (G.B.) Ld. 9
Silvertown Rubber Co. Ld. .. —
Simon-Carves Ld. .. .. —
Simon, Richard & Sons Ld. .. —
Siskol Machines Ld. .. .. —
Skefko Ball Bearing Co. Ld. 48
Skinningrove Iron Co. Ld. .. —
Smallman, Jas. W. Ld. .. 64
Smedley Bros. Ld. .. .. —
Smith & McLean Ld. .. .. —
Smith, John (Keighley) Ld. —
Smith, Thos. & Son (Rodley) Ld. .. .. —
South Wales Switchgear Co. Ld. .. .. —
Spear & Jackson Ld. 8
Spencer-Bonecourt-Clarkson Ld. .. .. —
Standall Engineering Co. Ld. 55
Standard Piston Ring & Eng'g. Co. Ld. .. .. —
Stanton Ironworks Co. Ld. .. —
Steam & Combustion Engineering Ld. .. .. —
Steel, A. & Sons Ld. .. .. —
Steel Co. of Scotland Ld. .. —
Steel Co. of Wales .. .. —
Steels Engineering Products Ld. 11
Steelway Ld. .. .. .. —
Stein & Atkinson Ld. .. 43
Stein, J. G. & Co. Ld. .. —
Stephens Silica Brick Co. Ld. —
Stewarts and Lloyds Ld. .. —
Stoddard, J. & Sons Ld. .. —
Stone-Wallwork Ld. .. .. —
Stothert & Pitt Ld. .. .. —
Strachan & Henshaw Ld. .. —
Structural Painters Ld. .. —
Sturdy Electric Co. Ld. .. —
Suffolk Iron Foundry (1920) Ld. .. .. —
Summerson, Thos. & Sons Ld. —
Super Oil Seals & Gaskets Ld. —
Sutcliffe Hydraulics Ld. .. —
Sutcliffe, Richard Ld. .. 1
Sutcliffe, Speakman & Co. Ld. —

Tattersall & Sons Ld. —
Taylor, F. & Sons (Manchester) Ld. .. .. —
Tees Side Bridge & Engineering Works Ld. .. .. —
Theedam, E. C. Ld .. .. —
Thermal Syndicate Ld. .. —
Thomas (Richard) & Baldwins Ld. .. .. —
Thompson, John, Conveyor Co. —
Thompson, John Water Tube Boilers Ld. .. .. —
Thompson & Southwick Ld. —
Thornton, B. Ld. .. .. —
Tinsley, John Ld. 61
Town, Fredk. & Sons Ld. .. —
Trewella Bros. (Pty.) Ld. .. —
Turner Bros. Asbestos Co. Ld. —

Underground Mining Machinery Ld. .. .. .. —
Unifloc Ld. .. .. .. —
United Fireclay Products Ld. —
United States Metallic Packing Co. Ld. .. .. .. —
United Steel Companies Ld. .. —
Uskside Engineering Co. Ld. —

Veitscher Magnesitwerke A.G. —
Victor Products (Wallsend) Ld. .. .. —
Visco Engineering Co. Ld. .. 33

Wade, Smith & Co. Ld. .. —
Wailes Dove Bitumastic Ld. —
Walker Bros. (Wigan) Ld. .. —
Wallacetown Engineering Co. Ld. .. .. .. —
Wallsend Slipway & Engineering Co. Ld. .. .. .. —
Ward, Thos. W. Ld. 60
Warner & Co. Ld. .. .. —
Wellman Bibby Co. Ld. .. 65
Wellman Smith Owen Engineering Corporation Ld. .. 37
West Bromwich Spring Co. Ld. —
Westinghouse Brake & Signal Co. Ld. .. .. .. —
West's (Manchester) Ld. .. —
West's Piling & Construction Co. Ld. .. .. .. —
Westwood Dawes & Co. Ld. —
Wharton Crane & Hoist Co. Ld. .. .. —
White, R. & Sons (Engrs.) Ld. —
Whittaker, C. & Co. Ld. .. —
Wickman Ld. .. .. —
Widnes Foundry & Engineering Co. Ld. .. .. —
Wigglesworth, F. & Co. Ld. .. —
Wild, A. G. & Co. Ld. .. 67
Willcox, W. H. & Co. Ld. .. 64
Wincott, G. P. Ld. .. .. —
Wolf Safety Lamp Co. Ld. .. —
Wood, Hugh & Co. Ld. .. 45
Wood, John & Sons Ld. .. —
Woodall-Duckham Construction Company Limited .. 28
Woodhouse, Joseph Chains Ld. .. .. —
Worsley-Mesnes Ironworks Ld. 58

Yeadon, Son & Co. Ld. .. —

Niagara Heavy Duty Scalping Screen. Can also be supplied in portable form with elevators and conveyors.

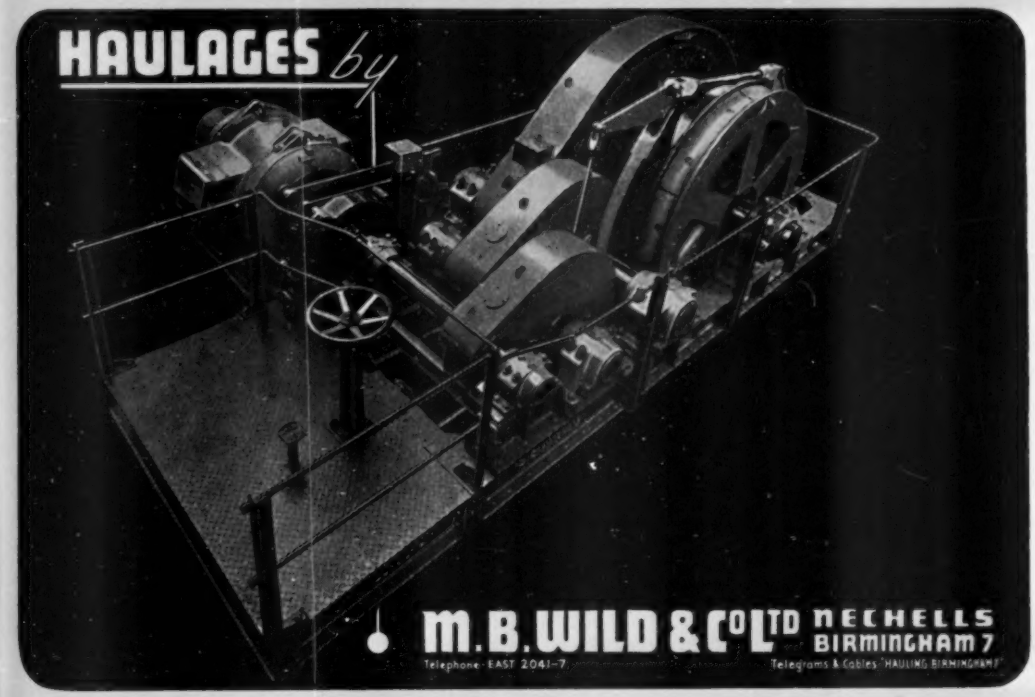
Why NIAGARA pays so well

Because you obtain regular and continuous separation with the highest possible grading efficiency, enabling you to conform absolutely to any given specification. Niagaras are built with one to four decks, which are tiered and can be equipped with any mesh. They will handle wet or dry material and can be totally enclosed for dusty work. Niagaras can be mounted easily on portable chassis with pneumatic tyres. They can be further equipped with feeders and conveyors. You can take Niagaras to work wherever wheels can roll.

Telephone: Enfield 6622 (4 lines)

NIAGARA SCREENS AND PLANT LTD.

STRAYSFIELD ROAD, CLAY HILL, ENFIELD, MIDDLESEX.



INDEX TO ADVERTISERS

Accurate Recording Instrument Co. — Adamson Alliance Co. Ltd. — Aerex Ltd. — Allen, Edgar, & Co. Ltd. 35 Allen West & Co. Ltd. — Allen, W. G. & Sons (Tipton) Ltd. — Alley & Maclellan (Polmadie) Ltd. — Allis-Chambers (Great Britain) Ltd. 53 Anchor Chain Co. Ltd. — Anderson, Boyes & Co. Ltd. — Anderston Foundry Co. Ltd. — Angus, Geo. & Co. Ltd. — Appleby-Frodingham Steel Co. — Armstrong-Whitworth (Metal Industries) Ltd. — Armytage & Sons Ltd. 55 Arnott, H. W., Young & Co. Ltd. — Arrol, Sir Wm. & Co. Ltd. — Ashmore, Benson, Pease & Co. — Ashworth, E. & A. Ltd. — Associated British Machine Tool Makers Ltd. — Associated Electrical Industries Ltd. (Electronic Apparatus Division) — Associated Electrical Industries Ltd. (Heavy Plant Division) — Associated Electrical Industries Ltd. (Instrumentation Division) — Associated Electrical Industries Ltd. (Motor & Control Gear Division) — Associated Electrical Industries Ltd. (Switchgear Division) — Associated Electrical Industries Ltd. (Traction Division) — Associated Electrical Industries Ltd. (Transformer Division) — Associated Electrical Industries Ltd. (Turbine Generator Division) — Atlas Copco (G.B.) Ltd. 49 Aurora Gearing Co. (Wilmot North) Ltd. — Austin, Jas. & Sons (Dewsbury) Ltd. — Automatic Coal Cleaning Co. Ltd. —

Bagnall, W. G. Ltd. — Bairds & Scottish Steel Ltd. 62 Barker, Davies & Co. — Barlow & Chidlaw Ltd. — Barnes & Bell Ltd. — Barrow Ironworks Ltd. 32 Bathgate, Richard A. — Bayliss, Jones & Bayliss Ltd. 46 Beckett & Anderson Ltd. — Becorit (G.B.) Ltd. — Bellis & Morcom Ltd. 21 Belmos Co. Ltd. — Beresford, Jas. & Son Ltd. — Berry, Henry & Co. Ltd. — Bigwood, J. & Son Ltd. — Birkett, Billington & Newton Ltd. — Birlec Ltd. — Birlec-Efco (Melting) Ltd. — Birtley Engineering Ltd. — Bivac Air Co. Ltd. — Blacks Mining Equipment Ltd. —

Blandford-Gee Cementation Co. Ltd. 65 Blantyre Engineering Co. Ltd. 16 Bolton Gate Co. Ltd. — Bonser Tristram Ltd. — Bradley, J. & Co. (Stourbridge) Ltd. — Bradley Pulveriser Co. Ltd. — B.R.D. Co. Ltd. 2 Brightside Foundry & Engineering Co. Ltd. 42 British Belting & Asbestos Co. Ltd. — British Electrical Repairs Ltd. — British Ermeto Corporation Ltd. — British Iron and Steel Federation — British Jeffrey-Diamond Ltd. — British Nylon Spinners Ltd. — British Paints Ltd. — British Rollmakers Corporation Ltd. — British Ropeway Engineering Co. Ltd. — British Steam Specialties Ltd. 64 British Thomson-Houston Co. Ltd. — British Timken: Division of the Timken Roller Bearing Co. — Broadbent, Thos., & Sons Ltd. — Broadwell Engineering Co. Ltd. — Brown David Corporation (Sales) Ltd. — Brush Electrical Engineering Co. Ltd. — Brush Traction Ltd. — B.T.R. Industries Ltd. — Burnand, W. E. & Son Ltd. — Burnside, George Ltd. — Burtonwood Engineering Co. Ltd. — Bushing Co. Ltd. —

Cable Belt Ltd. — Calomax (Engineers) Ltd. — Carbiox Ltd. — Cascade Water Coolers Ltd. — Causeway Reinforcement Ltd. — Ceag Ltd. — Cementation Co. Ltd. — Chloride Batteries Ltd. 4 Churchill Machine Tool Co. Ltd. — Clarke, Chapman & Co. Ltd. — Clark, Geo. & North Eastern Marine (Sunderland) Ltd. 51 Clayton Equipment Co. Ltd. — Cleveland Bridge & Engineering Co. Ltd. — Cobra (Wood Treatment) Ltd. — Cohen, Geo. Sons & Co. Ltd. — Colvilles Ltd. 12 Conflow Ltd. — Consett Iron Co. Ltd. — Consolidated Pneumatic Tool Co. Ltd. — Conveying Developments Ltd. — Cooke, Troughton & Simms Ltd. — Cooper, Jas. Milne & Co. Ltd. — Cooper Roller Bearings Co. Ltd. — Coppee Co. (Gt. Britain) Ltd. — Coulson, M. & Co. Ltd. 64 Courtaulds Ltd. — Cowlishaw, Walker & Co. Ltd. — Cox & Danks Ltd. — Craven Electronics Ltd. — Crawley Industrial Products Ltd. 26 & 27

Crofts (Engineers) Ltd. — Crompton Parkinson Ltd. — Crone & Taylor Ltd. — Crushing, Screening & Engineering Ltd. — Curtis, A. L. (Onx) Ltd. —

Davenport Engineering Co. Ltd. — Davey, Paxman & Co. Ltd. — Davis, John & Son (Derby) Ltd. — Davy & United Engineering Co. Ltd. — Dawson & Downie Ltd. — Deb Chemical Proprietaries Ltd. — Demag A.G. — Denison, Samuel & Sons Ltd. 61 Denver Equipment Co. Ltd. — Deri (Engineers) Ltd. — Distington Engineering Co. Ltd. — D.M.M. (Machinery) Ltd. — Dobson, W. E. & F. Ltd. 13 Dollery & Palmer Ltd. 18 Donkin, Bryan Co. Ltd. — Dorman Long & Co. Ltd. — Dougall, James & Sons Ltd. — Downings (Barnsley) Ltd. — Dowty Mining Equipment Ltd. — Dust Suppression Ltd. —

Eagre Construction Co. Ltd. — Eickhoff, Gebr. — Elmco (Gt. Britain) Ltd. 20 Elastic Rail Spike Co. Ltd. — Elcordia Ltd. — Electrical Development Association — Electric Furnace Co. Ltd. — Ellis, A. & Sons (Wakefield) Ltd. — English Electric Co. Ltd. — English Steel Corporation Ltd. — Evans, Joseph & Sons (Wolverhampton) Ltd. — Ewart Chainbelt Co. Ltd. —

Fearnehough, W. Ltd. 63 Feico Hoists Ltd. — Fenner, J. H. & Co. Ltd. 6 & 7 Ferranti, D., Meters Ltd. — Finlay Engineering Co. Ltd. — Firth, Thos. & John Brown Ltd. — Firth-Vickers Stainless Steels Ltd. — Flame Hardeners Ltd. — Flouch Garage & Engineering Co. Ltd. — Follsain-Wycliffe Foundries Ltd. — Foraky Boring & Shaft Sinking Co. Ltd. — Foster, Henry & Co. Ltd. — Foster, H. Johnson Ltd. — Fowler, John & Co. (Leeds) Ltd. — France, Joseph Ltd. — Fullerton, Hodgart & Barclay Ltd. —

Gas Council — General Electric Co. Ltd. 38 General Refractories Ltd. — Gent & Co. Ltd. — Gibbons Bros. Ltd. — Gibbons (Dudley) Ltd. — Glencairn Metals Ltd. — Glover Bros. (Mossley) Ltd. — Glover, Wm. Jas. & Co. Ltd. 70 Goodall, Clayton & Co. Ltd. — Goodyear Tyre & Rubber Co. Ltd. — Green, E. & Son Ltd. — Green, Horace & Co. Ltd — Greening, N. & Sons Ltd. — Guest, Keen Iron & Steel Co. Ltd. — Gullick Ltd. — Gutehoffnungshutte Sterkrade —

Hackbridge & Hewittic Electric Co. Ltd. 10 Hadfields Ltd. — Hale & Hale (Tipton) Ltd. — Halesowen Steel Co. Ltd. 60 Hall Bros. (West Bromwich) Ltd. 62 Hallamshire Steel Co. Ltd. — Hanmade Conveyor Co. Ltd. 41 Hardman, E. Son & Co. Ltd. — Harland Engineering Co. Ltd. 59 Harlow, Robt. & Son Ltd. — Harvey, G. A. & Co. (Ldn.)Ltd. — Hayden-Nilos Ltd. — Head, Wrightson & Co. Ltd. — Head, Wrightson Minerals Engineering Ltd. — Head, Wrightson Machine Co. Ltd. — Head, Wrightson Teesdale Ltd. — Heap, Joshua & Co. Ltd. — Heeley (Mining Machinery) Co. Ltd. 60 Hick, Hargreaves & Co. Ltd. — Hill, Richard Ltd. — Hills (West Bromwich) Ltd. — Hollybank Engineering Co. Ltd. 30 Holman Bros. Ltd. — Holroyd, John & Co. Ltd. — Honeywell Controls Ltd. — Hopkinson, A. & Co. Ltd. — Hornsby & Goodwyn Ltd. — Hoy, Austin & Co. Ltd. — Hudson, Robert Ltd. — Hudswell, Clarke & Co. Ltd. 31 Humber Graving Dock and Engineering Co. Ltd. 51 Hunslet Engine Co. Ltd. — Huntington, Heberlein & Co. Ltd. —

Imperial Chemical Industries Ltd. — Incandescent Heat Co. Ltd. — International Combustion Products Ltd. — International Construction Co. Ltd. — International Harvester Co. of Great Britain Ltd. — Intrafor Mining Engineers Ltd. —

(*Continued on page 66*)

Published by the Proprietors, INDUSTRIAL NEWSPAPERS (FUEL & METALLURGICAL), LIMITED, John Adam House, 17/19, John Adam Street, London, W.C.2, and Printed in Great Britain, by HARRISON & SONS, LIMITED, by Appointment to Her Majesty The Queen, Printers, London, Hayes (Middx) and High Wycombe.

The HEELEY SHEAR DRUM *with* HIGHER SPEED METALS PICKS

★ FASTER HAULAGE SPEEDS
★ A MINERS PICK, MECHANISED
★ AMPERAGE DOWN
★ LARGER COAL
★ LESS RECIRCULATION
★ THE ONLY DRUM WITH PICK POINT ATTACK
★ A HIGHER PERCENTAGE OF COAL DEPOSITED ON CONVEYOR

A Product of the

HEELEY (MINING MACHINERY) CO LTD.
NUNNERY COLLIERY, WOODBOURN ROAD,
SHEFFIELD, 9

Telephone : 22836

IRON & COAL

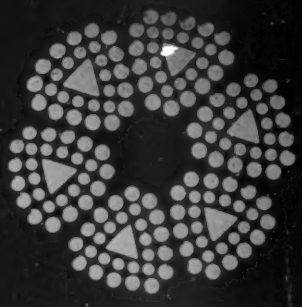
ESTABLISHED

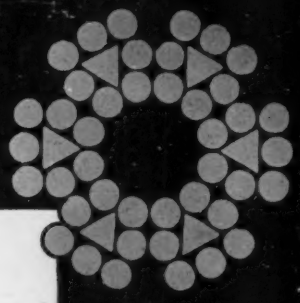
TRADES REVIEW

VOL. 181
No. 4,798

Offices: John Adam House, 17/19, John Adam Street, London, W.C.2
LONDON: FRIDAY, JULY 1, 1960

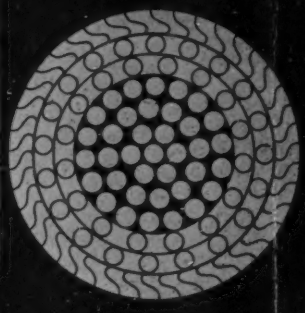
Registered as a Newspap
Single copies 1s. By post 1
Ann. Subn.: 52s. (Abroad 6

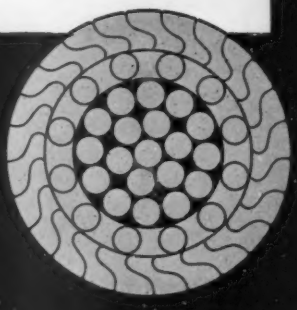




STEEL WIRE ROPES FOR ALL PURPOSES

"Glover's Best"





WM. JAS. GLOVER & CO. LTD., ST. HELENS, LANCS.
Telephone: St. Helens 6159. **Telegrams: "Glovers, St. Helens"**

A Member of the Glover Group

L
EEL
PES
FOR
ALL
SES